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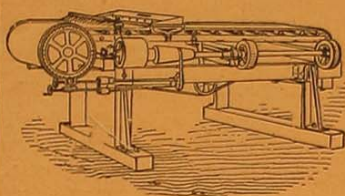
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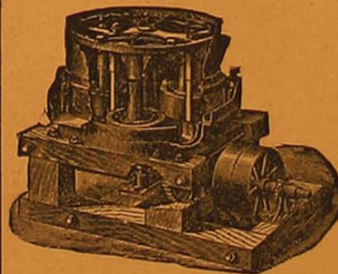
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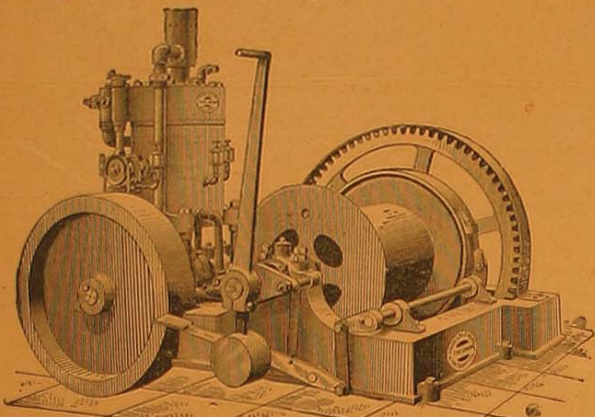
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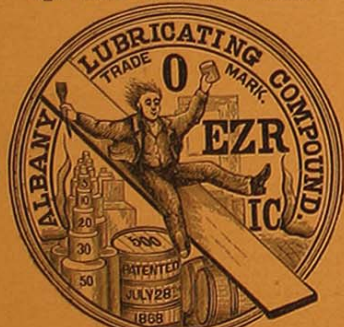
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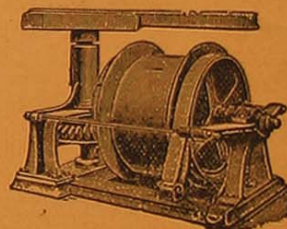
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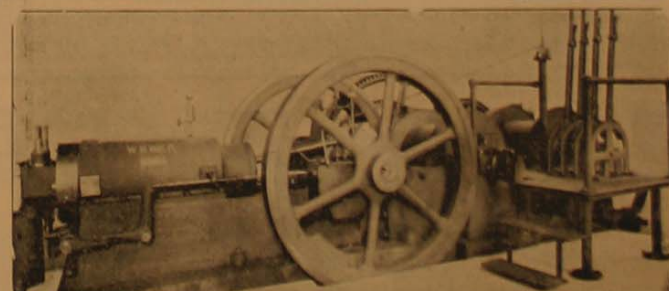
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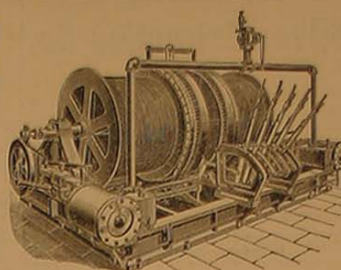
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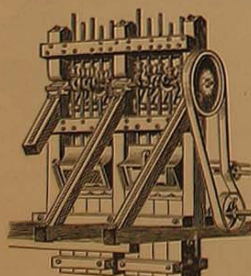
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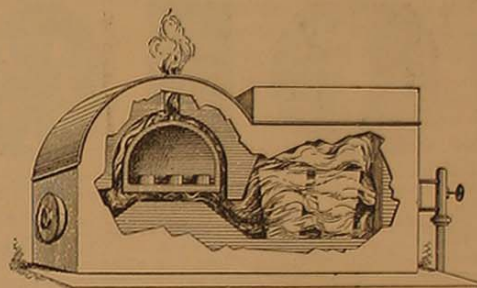
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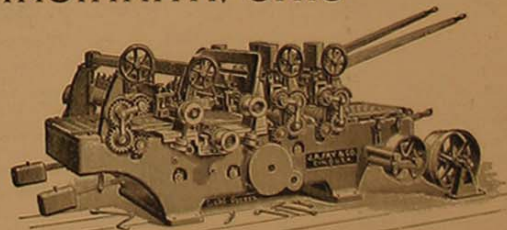
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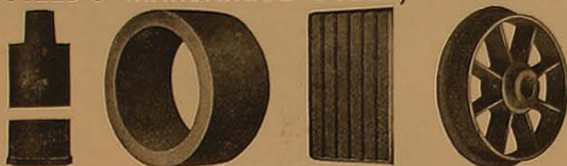
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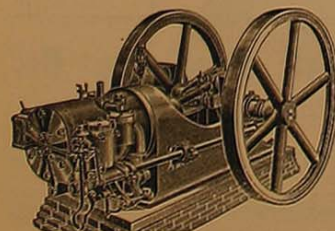
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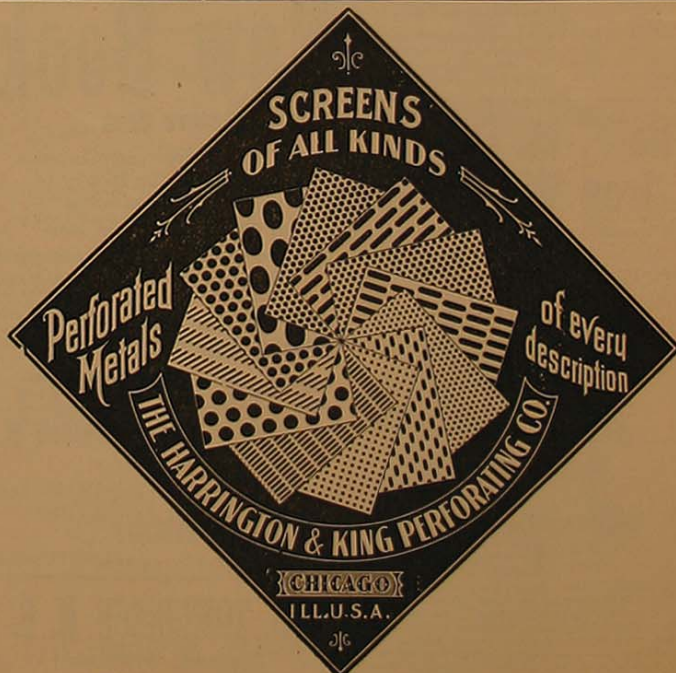


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sulphide), cinnabar (sulphide of mercury), etc., etc. The ores may also contain the metals combined with chlorine, tellurium, sulphuric, carbonic or silicic acid, etc., etc. There are a great many more combinations which it is unnecessary to mention in mention in this article.

Now then if one ore (say a copper ore) contains besides the gangue, chalcocite or copper sulphide, then, as pure chalcocite is composed of 79.8 per cent. copper and 20.2 per cent. sulphur, it naturally follows that the highest possible percentage of copper in this ore would be 79.8 per cent., which would only be true if there were no gangue mixed with the copper mineral.

Following up this same way of reasoning, we would find that pure cuprite or red oxide of copper could not contain more than 88.8 per cent. copper (the balance, 11.2 per cent., being oxygen). Or again, if our ore were pure chalcocite (combination of copper, iron and sulphur), then its highest possible percentage in copper would be 34.6 per cent., the balance of the mineral being, sulphur 34.8, iron 30.5.

The percentage in metal of a few of the commonest minerals that a prospector or mining man may come across, might be useful to some of our readers, and we here give it:

Magnetite (magnetic iron ore).....Iron,	72
Hematite (red oxide of iron)..... "	70
Iron pyrites..... "	46.6
Cuprite (red oxide of copper).....Copper,	88.8
Malachite (green carbonate of copper)..... "	57.4
Azurite (blue carbonate of copper)..... "	55.2
Chalcocite (copper pyrites)..... "	34.6
Galena (lead sulphide).....Lead,	86.6
Zinc blend (zinc sulphide).....Zinc,	67

To further benefit some of our readers we will add to the above little exposé and list, that should they be, for instance, in the desert and far from any assay office, and should they come across a piece of ore containing a mineral which by their previous experience they know to be galena, their next question is: What per cent. of lead does it carry? The intelligent man can then break up the piece to the size of a nut, and with a little practice can guess reasonably close what is the proportion of galena and of gangue in the sample considered. Let us suppose that he considers that there is about 3 parts of gangue and 1 part of galena in the total 4 parts of rock; he has then but to reason as follows: If the 4 parts (or the whole of the specimen) were pure galena, the percentage of lead would be 86.6; but of the 4 parts in this case only 1 part (or a quarter) of the specimen is galena; then the percentage of lead should be approximately $\frac{1}{4}$ of 86.6, or 21.6 per cent. Of course this is very rough, but if the prospector then has his sample run for lead by some reliable assayer, it would be but a very short while before his eye would become accustomed to judging very near to the reality.

GEOLOGICAL SURVEY OF KANSAS.

Through the courtesy of Professor Erasmus Haworth of the University of Kansas we are in receipt of four large handsome volumes of the University Geological Survey of Kansas.

VOLUME I.

Treats of the stratigraphy of the Carboniferous of Kansas, also a preliminary report on the Oil and Gas in Kansas, and Preliminary Catalogue of the Paleontology of this period.

The text is illustrated by twelve figures and also by thirty-one plates.

VOLUME II.

Reports on the stratigraphy and general geology of Western Kansas, including the Upper Permian, the Cretaceous, and the Tertiary. Illustrations include thirteen figures in the text and forty-eight plates.

VOLUME III.

Special Report on Coal, with fifty-four figures in the text and seventy plates.

VOLUME IV.

Contains the first part of Professor Samuel W. Williston's report on the Paleontology of Kansas. The volume is dedicated to the memory of Professor Benjamin F. Mudge, the first geologist of Kansas, of whom the author presents a photo, and pays a high tribute to his memory, as an excellent teacher, a faithful friend, and an honest man. This volume has as a Frontispiece, Reptiles of the Kansas Cretaceous Ocean, from a painting by J. Carter Beard, which has been for the most part based upon the restorations of this volume and others published by the author, and contains one hundred and twenty plates.

The whole of the series of volumes are uniform in size and printed in large, clear type, with wide margin, which in a scientific and reference work of this kind is useful for the reader's or student's private notes or remarks. Another desirable feature is the binding with each volume of the sections and plans, figures and plates which illustrate each volume and form an appendix to each. A complete index is given at the end of each volume, a rare feature in American works. From the large number of species of fossils collected, the stratigraphy of the rocks described seems to have been worked out with care, as their collection is proof of the intimate acquaintance of the author with his subject, and that the work was not done in a superficial, "walk over the country," but was conducted in a systematic and thorough manner, which can only be accomplished by much hard work and is only undertaken by such as have a thorough love of the work involved, both in the collecting and classification of the results. Although ample justice has been done to the scientific part of the geological examination of the rocks of Kansas, the economic and commercial development of the mineral resources of the State are illustrated and described by the methods of operating the mines and the classes of machinery employed, together with statistics of coal and coke, and mine directory by W. R. Crane; table of mines, showing the depth of shafts, grades of coal, strata, etc.; table of machinery, and the mining laws, rendering Volume III. of special interest to coal miners and engineers outside the limits of the district described. In future volumes it is to be hoped that the other industries, such as oil, cement, gypsum, lime, etc., will receive the same care and attention. Geology as a science pure, study, has interest for a few, and for that reason the commercial application of geological knowledge has an important bearing on the development of the mineral resources, to make them known to capital and labor. Volume IV. contains a page of the past life history of the earth which Moses and the Prophets neglected to mention, but although Moses was the first miner on record, the author has gone to the trouble to write the history of paleontological research in Kansas as far back as records go, which is a task requiring much research, as well as contributing original matter to the legend. From a scientific and educational standpoint, this handsome volume has special

interest, and reflects credit to the State of Kansas, the University, and to the authors of it. The mining interests of Kansas, although not of great diversity, will receive notice by the continuance of the work already commenced in these volumes, by future publications which will cover the whole field.

CORRESPONDENCE

NEW MEXICO.

Electric Smelting.

In your issue of December 1st, you refer to an inquiry concerning the use of electricity as an agent in heating for an assay furnace, and incidentally refer to Ahearn's methods of electrical heating.

As one having had extensive experience in the use of electric current for heating and metallurgical purposes, I may be permitted to make some remarks upon the subject. If they answer your correspondent's purpose, or serve to enlighten your general reader, I shall be pleased.

Ahearn's, and all the other electrical heating devices, so extensively used in the heating of street cars, cooking utensils, etc., convert the electrical energy into heat, by sending the current through a resistance, consisting of iron, german silver, or other wire or strips of high resistance. Their patents are based upon the various methods of insulation and protection of the coils from oxidation effects of the atmosphere. One of the earliest was Burton's, consisting of a simple iron wire, zigzagging across a frame, which was then buried in powdered fire clay. It made a very good and effective heater.

But none of these devices could possibly produce a temperature suitable for smelting purposes, as the wires being themselves metal would also melt.

The neatest way to smelt electrically consists in using black lead or plumbago crucibles, which being conductive to the electric current, and of high resistance, may be made the means of producing the heat within themselves. It is simply necessary to stand the pot on a heavy copper plate connected to one pole of a dynamo, another copper plate acting as a cover for the pot, which should fit neatly, and to which the other pole of the dynamo is attached.

Of course, anyone conversant with electrical matters understands that the heating effect is a result of the quantity of current sent through more than of the pressure or voltage. It therefore becomes necessary to have a current of high amperage and low voltage. If an alternating current be available, this is readily obtainable by means of a special transformer. The welding outfits of the General Electric Co. are available for this work, the plumbago pot taking the place of the piece to be welded.

I have smelted in such a pot with direct current by placing the pot in series with the lighting system of lamps (incandescent) and varying the current by turning lights on or off. Magnetite, otherwise infusible, may be melted in this way. In such smelting as I have described the heating of the charge is by radiation, the same as in a muffle furnace.

Moisson, the French experimenter, uses more largely, I believe, the pot as one pole and a thick carbon rod immersed in the charge as the other pole. In this case the charge if not conductive, must be made so by the addition of charcoal powder.

Very truly, MARCUS RUTHENBURG, E. E.
Silver City, N. M., Dec. 12, '98.

MOUNTAIN BEAUTY MINING CO.

One of the recent incorporations in Los Angeles, Cal., in a mining way, was the incorporation, November 18th, under the laws of California, of the Mountain Beauty Mining Co., with properties at Oak Grove, San Diego county, Cal. The capital stock has been placed at the exceedingly reasonable figure of \$250,000, and has a par value of \$1.00. The stock is fully paid and non-assessable.

The general office of the company is at present in the Homer Laughlin building, and the directors and officers are as follows: E. H. Little, president and manager, a thoroughly practical miner and business man; J. A. Shelhamer, vice-president; F. J. Eddy, secretary and treasurer; E. H. Caner, and H. A. Perkins.

The properties of the company, as afore mentioned, are located near Oak Grove, San Diego county, Cal., at an altitude of 5,500 feet, with an excellent climate summer and winter, and plenty of wood and pure water; it is estimated that from fifteen to twenty-five inches of water can be made available for power purposes, with a fall of about 300 feet. They consist of the Mountain Beauty, Beauty's Annex and Jesse L. gold mines.

The country rock is granite and syenite, with mica schist running with vein; large dykes of granite and porphyry are running parallel with all of the veins, forming contacts in which the ores are found. The Mountain Beauty mine is well defined, and the croppings, which average six feet in width, prospect the entire length of the claim, 1,500 feet. A drift has been run in thirty feet with the lead, following the foot wall, and a cross-cut run twenty feet all in pay ore. At the junction a chamber has been made and a five by six foot shaft, following foot wall, has been sunk between twelve and fifteen feet, with a five foot vein of ore. Another tunnel is in nearly 100 feet, and is about 135 feet lower than the first. It is proposed to run this tunnel 1500, and the system of development work mapped out by the directors will place the mine in a condition to properly extract the ore at a minimum of cost.

The ore is free milling quartz, of a rosy hue, and from 100 to 125 tons are on the dump at present.

The Beauty's Annex and Jessie L. mines run parallel with and adjoin the Mountain Beauty mine on the east. These veins will

average $3\frac{1}{2}$ feet in width on the surface, are well defined, in same formation as the Mountain Beauty and prospects from wall to wall.

An important fact noticed in the formation of this company is that the directors are not paid for their services while acting as such.

One of the officers stated the other day that the first block of 5,000 shares, had been sold at 40 cents per share, and that the second was now on sale at the same price. The second block will place sufficient money in the treasury to prosecute the necessary development work, which will be pushed vigorously.

The Pioneer Mutual Mining & Exploration Co. is the name of a corporation backed by such men as Fred. K. Rule, the treasurer of the Los Angeles Terminal Railway Co.; F. P. Flint, United States District Attorney; A. C. Jones, of the Los Angeles Furniture Co., N. F. Wilshire; A. C. Harper, of Harper & Reynolds Co., O. Pooley and H. M. Russel, mining men of note; H. J. Fleishman, the cashier of the Farmers' and Merchants' Bank of Los Angeles, and L. M. Gregory, the agent for the Washington Life Insurance Co.

The following officers were elected for the first term. Fred. K. Rule, president; A. C. Jones, vice-president; O. Pooley, secretary; H. J. Fleishman, treasurer; F. P. Flint, attorney; Chas. Kowdy, manager of agencies.

The corporation has capital stock of \$10,000,000, and was incorporated under the laws of Arizona.

The objects of the Pioneer Mutual Mining and Exploration Co. are to give an opportunity to invest in a general mining business, conducted on the safest basis, by contributing small monthly installments, to add the profits to the amount paid in, until each share is worth \$50, and to participate after maturity in such dividends as may be apportioned annually by the Board of Directors.

Further, to develop properties against a certain interest, or to bond such properties. To buy or sell mining properties, and to invest in such manner as deemed advisable by the Board of Directors and mining experts. This will give any one with a monthly investment of 50 cents per share an opportunity to participate in selected, A No. 1, mining properties, and not only in one but in a number of them, so that the chances of losses are reduced by the law of average to a minimum, while one good mine can easily yield returns that will mature the stock in a very short time. This plan will make the investor, sooner or later, a partner in very desirable mining properties, which by individual effort one may never be able to accomplish. Nothing yields larger returns than a good paying mine. Under this plan, all stand on an equal basis, and if you become a shareholder, you become a partner in proportion to your investment. This insures an equal chance to the smallest investor, and absolute fairness.

In its "Preamble," the Company says: "It has been proven by those who have made the most money out of mines that the best way is to take hold of a claim in a good locality which looks as if it had some future to it, prove its worth by labor, and then expend the necessary money for a plant. The few thousands spent in this way often return many hundred fold. There are great numbers of this class of mines in the mining regions of the country, and they may be readily and cheaply acquired.

"By creating a fund which yields a certain income every month, we can work mining properties in such an increasing number that we must obtain an average result. In this



CROPPING ON MOUNTAIN BEAUTY MINE.

sense, we have made the law of average the fundamental principal of our undertaking. To illustrate, there are 100 properties offered to the company. Our mining experts find that only 10 are first class and 90 as inferior. Out of the 10 recommended prospects, there may be one or two a success, and pay eventually \$1,000 a month. This certainly would pay amply for the expense of the other eight and make a sure gain, as by the careful selection, and accepting a number of the best, we have obtained the advantage of a favorable average, while, on the other hand, if 100 different owners individually would develop each one his prospect, and they were equally successful, 98 would be losers against only two winners, thus explaining the so often discouraging loss in mining, as the availability of average assured in our company was unobtainable by these individual workers.

The Battle Creek Steam Pump Co., of Battle Creek, Michigan, has issued their catalogue, No. 9, illustrating the Marsh Steam Pump, a standard for all duties. These pumps have absolute actuation and regulation, are fitted with patent self-governing steam valves, patent, easy-seating water valves, and have no outside valve gear. They are simple not duplex. As Emerson says, "to be simple is to be great." They have a maximum of strength and service, are economical, efficient and durable, and are adapted for every service.

This catalogue is well gotten up, having been printed on fine glazed book paper, with an elegant lithographed cover. The lists and detail tables have been arranged with care, and in convenient form.

The first section of the catalogue is devoted to standard boiler feed pumps. Section two embraces tank and vacuum pumps, while section three describes air compressors. Section number four calls attention to deep well pumping engines. The fifth section of the Utah catalogue shows pumps for handling the hot water of condensation. A description of pumps for sugar-house work comprises section six, and the Marsh sinking pump is described in the seventh section, while the eighth section contains illustrations of Marsh creamery pumps. Section nine speaks of Marsh hydraulic pumps and engines, and the last section, which is number ten, is a general resume of miscellaneous Marsh pumps.



TUNNEL ON MOUNTAIN BEAUTY MINE.

AMERICAN DEVELOPING AND MINING COMPANY.

The town of Gibbonsville is situated in Lemli county, Idaho, about four miles west of the summit of the Rocky Mountain Range and thirty-five miles in a northerly direction from Solomon City, the county seat, at an altitude of 4,500 feet above sea level.

Placer gold was first discovered near the site where Gibbonsville now stands in the early '70s by Montana prospectors enroute to the Loon Creek placer excitement, forty-five miles further west. Soon after, profitable mining was carried on by the Nicholson Brothers.

Afterwards, in August, 1877, quartz veins carrying gold were discovered on what is now known as Gibbonsville Hill, and later on, in the fall of the same year, the miners organized the Dablonega mining district, to cover all the area west of the summit of the Rocky Mountain range drained by the north fork of the Salmon river and its tributaries.

In the spring following, (1878), on petition of the residents of the district a postoffice was established and named Gibbonsville, in honor of Gen. Gibbons, who commanded the United States troops against the Nez Perces Indians under chief Joseph in the celebrated battle of Big Hole, fought the previous year. From this time on a large number of men were occupied in mining the surface ores of the district. These were successfully treated in arrastras and small mills, but when the sulphide ores were encountered the primitive plants failed to treat the ore profitably.

In this condition the American Developing and Mining Company, a syndicate of Whitehall, Montana, men, found the camp in 1892, and purchased the principal group of mines there. Since that time the systematic development of these mines and their equipment with mining and milling plants have been conducted on an extensive scale with favorable results by this company. On Gibbonsville Hill the company owns thirty lode claims, from the surface ores of which \$450,000 had been extracted by the original owners, with the primitive methods above outlined. In the neighboring gulches and adjacent hillsides it also owned about 600 acres of placer claims and millsites.

For the development of its lode claims the company has adopted a system of adit cross-cut tunnels, three in number, 130 feet apart, vertically. These tunnels, with the drifts, raises and winzes run on the veins from

them, aggregate a total development of about 20,000 lineal feet.

Owing to the fact that the mines are developed and operated through adit tunnels and the compressed air used by the drills generated by water power, the mining plant while effective is comparatively small and cheaply maintained. As may be seen in the illustration it consists of a building 30x64 feet, containing an air compressor, machine shop, store room and also a building 26x40 feet for blacksmith shop, with lean-to for charcoal bins, situated at the mouth of No. 3 or deep tunnel. A special ore bin of 400 tons capacity receives the ore as delivered from the mines.

The buildings comprising the reduction plant are shown in the illustration, and the mill has ample capacity for the treatment of 100 tons of crude ore and twenty tons of concentrates daily, using a combination of processes which may be described in three sections as follows:

First: Stamp crushing and amalgamation of the free gold and copper plates, followed by concentration of sulphurets from the pulp on Frue Vanners.

Second: A Pearce turret furnace with roasting oven annexed for

mine and mill work; it is equipped with the best of modern appliances for the analyses of ores, and contains drying, melting and assay furnaces, and charcoal chute conveniently arranged. A telephone line connecting mine, mill main office and town affords the usual facilities for inter-communication.

The stamp mill and equipment was first erected and operated in September of 1895, and for four months after starting it was in successful operation, during which time it had produced over \$40,000 in free gold and over 900 tons of concentrates valued at \$60 per ton. The value is mostly gold, only one per cent being silver.

The property has had a varied existence from the first, and while it is an excellent property today it has had the misfortune of passing into the hands of a receiver.

The following report was turned into the United States court at Butte, Montana, by the receiver, F. W. Bacorn for the month of November:

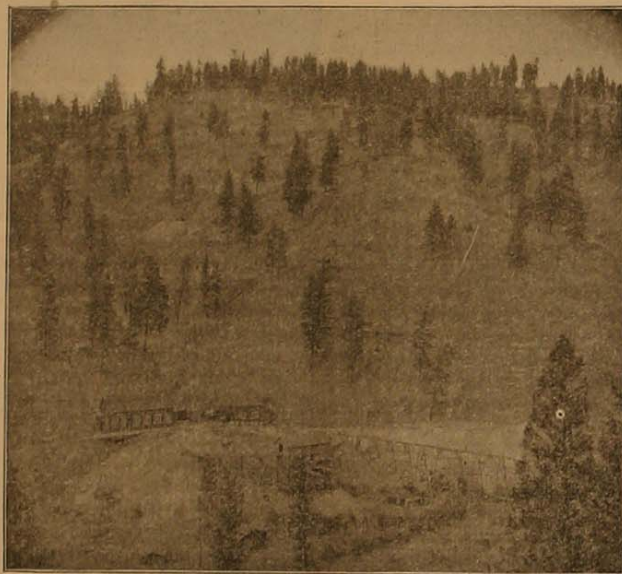
"There was produced of what is known as plate bullion, \$8,624.65, and 78,000 tons of concentrates, which, after deducting loss in cost of treatment, it is estimated, will have a net value of \$2,447.60, making a total product for the month of \$11,072.25. The expenses were as follows: Pay roll, \$3,840.40; supplies consumed, \$940.50; ore purchased, \$7,403.65; total expenses, \$11,924.55, the costs exceeding the earnings by \$852.30.

"At the Gibbonsville store the sales amounted to \$3,337.02. In addition to this goods to the amount of \$635.66 were used by me in the operation of the mine and mill, and are included in the item supplies consumed, \$940.50 above."

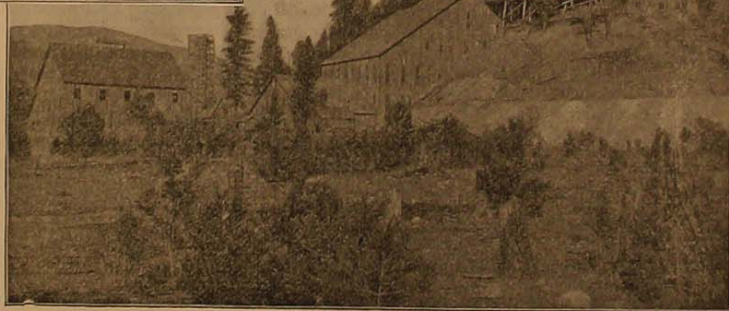
The document also includes a balance sheet showing that the receiver had \$1,814.27 in cash on deposit and otherwise, that \$6,302.79 has been paid to former employees of the company in accordance with the order of the court; that \$3,337.48 has been paid for legal expenses, office expenses and allowance paid receiver under order of the court; that \$2,993.50

has been paid for maintenance of the property in the receiver's hands, under orders of the court; that \$2,400 has been paid in settlement of certain damage cases against the American Development & Mining company under orders of the court; that \$10,000 has been borrowed from the Union Bank & Trust Co., of Helena upon receiver's certificate No. 1.

The Sioux Corliss engine, at the Omaha Exposition, was awarded the gold medal over its competitors. This engine was built by the Murray Iron Works Co., of Burlington, Iowa, and it was in continuous operation, twenty-four hours per day, during the greater part of the Exposition, furnishing all of the power used on the grounds.



AMERICAN DEVELOPING AND MINING COMPANY'S MINE.



AMERICAN DEVELOPING AND MINING COMPANY'S MILL.

the process of dead-roasting of the concentrates.

Third: Chlorination of the roasted sulphurets in the revolving barrels and precipitation of the metallic gold from the chlorine solution.

The first action of the plant is the ordinary gold 30-stamp mill especially arranged for the crushing amalgamation and concentration of auriferous pyritic ores, fitted with the most approved automatic and economical devices.

The whole plant as above described is driven by water power and lighted by electricity. The water power is supplemented by a steam plant of sixty-horse power to be used for auxiliary power and steam heating purposes when occasion demands.

An assay office is conveniently situated for

A FIFTY HORSE POWER GASOLINE HOIST.

One of the largest gasoline double drum hoists ever built, is the one built for the Minas de Santa Maria de La Paz, Matehuala, Mexico.

The gross measurements are: 17 ft. 6 in. long by 9 ft. 6 in. wide and the drums are so arranged that they may be operated independently of each other, and are controlled by a set of four levers, the two for operating the lead screws and the two operating the brake bands as well as a lever for actuating the governor, are all mounted on a suitable platform, so as to enable the operator to maintain full control of the entire hoist without moving from his position. It is also fitted for both tube and electric igniter and weighs 25,000 lbs.

The hoist has operating cages in a double compartment shaft and the duty on each drum consists of lifting 15 metric tons 400 meters per hour, making 22.2 H. P. of 75 kilogram-meter on each drum.

One of the important features of this hoist is, that the operator may reduce the speed of the engine between loads if necessary.

While in the testing room before shipment, this engine running at 100 revolutions per minute used the exceedingly small amount of 6 gallons, 74 degree gasoline in 10 hours continuous running in another test it developed 48 Brake H. P. continuously for 10 hours on a consumption of 48 gallons of gasoline, and a third test developing 24.3 H. P. it consumed 29 gallons of gasoline, on a 10 hour continuous run.

It will be seen from the above

tests that the consumption of fuel in a gasoline hoisting engine is in exact proportion to the number of foot pounds lifted in a given time, basing the calculation on 1-10 of a gallon of gasoline to each H. P. exerted per hour.

Using the tank system for water circulation around the water jacket and valve chambers is also an important factor in present location of this engine where water is a very scarce and expensive article as the evaporation during a day and night on a continuous 40 H. P. load was only 22 gallons. This hoist was built by the Weber Gas & Gasoline Engine Co., 434 S. W. Boulevard, Kansas City, Mo.

Graphite.*

One of the most important materials of commerce and of the arts is graphite. Its origin, its nature, its formations, its sources of supply and its many uses, would make a most interesting publication while its possible importance and its uses in the future are only beginning to be grasped by enthusiasts of today.

Graphite is one of the many forms of carbon; it is a triplet brother of diamond and

charcoal; it is closely related to the coal family and in combination it is related to all organic matter indeed, the chemical study of organic bodies is now termed "the chemistry of carbon compounds."

Diamond and graphite are crystallized forms of carbon, while all, or almost all other forms are amorphous. Therefore, while graphite, plumbago and blacklead are practically one and the same thing, the term blacklead is commercially applied to the graphite which comes from Germany, Bulgaria, Mexico, and many other places.

The "transmutation" of metal is probably far distant in the future, but diamond and graphite are being regarded as being "inter-changeable from a molecular point of view." That is to say, they are regarded as consisting of the same substance, under different conditions of molecular arrangement. The diamond can be changed into graphite, graphite can be changed into diamond—but not at a profit in either case.

Properties.—Graphite or carbon in any form is insoluble, not fusible or volatile, but combustible, forming carbon monoxide, or the dioxide usually. Graphite is an excellent conductor of heat and electricity; it has a

glazing his powder to prevent the absorption of dampness, and the shot manufacturer to to polish his shot and make it so smooth and slippery that the charges will not be crowded.

The organ and piano manufacturer uses graphite for lubricating piano action and organ slides; the housewife uses stove polish, and every one of us uses graphite in the form of lead pencils. In fact, it can be said in all truth that graphite is more or less used by every industry and by everyone throughout the civilized world, and that it is quite as indispensable to the requirements of the world as iron itself.

Caution.—Graphite, as it comes from the mine, contains from 50 to 60 per cent. silica, sulphur and other impurities, and the process of completely freeing the graphite from impurities requires very expensive machinery and the most skillful manipulation. Only manufacturers having such facilities can hope to produce an absolutely pure article. The impurities in much of the graphite now in the market take on the appearance of graphite by contact, and such impurities are sometimes undetected even by the expert, unless chemical tests are employed. This is especially true of amorphous graphite, commonly called black-lead, which is graphite without any particular form and usually mixed with clay.

Graphite is the name of a new publication of which we are in possession of Vol. 1, No. 1. It is issued in the interest of Dixon's Graphite productions and for the purpose of establishing better understanding in regard to the different forms of Graphite and their respective uses.

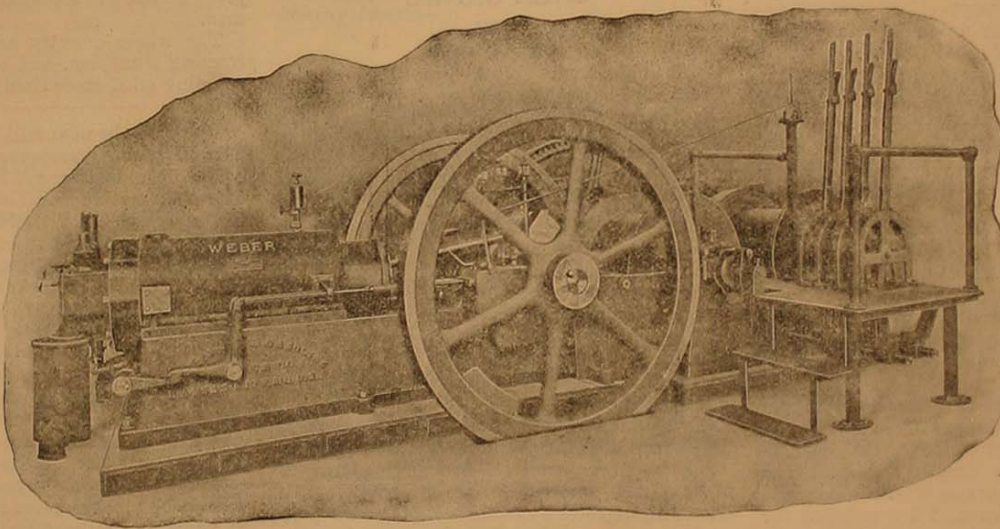
It is copyrighted by the Joseph Dixon Crucible Co. of Jersey City, N. J.,

has four pages, and is full of interesting reading about the all useful graphite.

The Connersville Blower Co. of Connersville, Ind., have issued their 3rd catalogue of Pressure blowers, Rotary pumps; Gas exhausters and Hydraulic Motors for 1898. The catalogue is handsomely gotten up covered with a heavy dark green paper cover embossed in gold. The body of the pamphlet is printed on heavy glazed paper and shows numerous beautiful halftone and line illustrations. On the whole it is an excellent type of the modern catalogues and contains no other advertisements than their own.

Mining Location Notices.

Mining Location Notices are required by law to contain certain distinct statements. A notice which fails to contain them may cause serious trouble, and may possibly invalidate your title to valuable property. By using notices prepared, so that the locator cannot fail to state everything required by law, trouble from that source is avoided. Bell's California Mining Location Notices will be found correct in this particular.



FIFTY HORSE POWER GASOLINE HOIST.

smoothness and lubricating power not known in any other solid substance. These properties make it invaluable for the many present uses and it is these properties that will carry its usefulness beyond our greatest expectations.

Uses.—As a lubricant, whether in dry form or mixed with oils or greases of any kind, it is recognized by both scientific and practical men as absolutely without an equal.

While its qualities as a paint have long been recognized by many careful investigators, it is only during 1898 that it has been most conclusively demonstrated to the world generally to be pre-eminently the best preservative coating for exposed metal surfaces.

Graphite crucibles for melting brass and all other metals, and graphite stoppers, skimmers, ladles, and other heat-resisting devices are known to every foundry-man and worker in metals as are also graphite or black-lead facings and washes for molds and cores.

The electrolyser depends upon graphite for perfect electrotypes; the electrician uses graphite for resistance purposes in making up his rheostats and his lightning arresters and for commutator dressing as well as for many other purposes.

The powder manufacturer uses graphite for

* From Jos. Dixon Crucible Co.'s December number of Graphite.

Miscellaneous Mining News.

ALASKA.

Berners bay is keeping up its reputation, the Ophir, Northern Belle, Bald Eagle and Seward all having their mills in operation. Judge Mellen, who represents an Indiana company, and who successfully opened up the Jualin, is now developing the Ivanhoe, over the ridge between the Jualin and the Comet, and has about completed a 20-stamp mill. The Jualin has turned out \$10,000 or \$12,000 a month since it started. Milo Kelly has some very good claims in the Berners bay district, showing free milling ore, and is working them. Montana creek, which runs into Linn canal between Berners bay and Juneau, is coming to the front. The placers were worked in the early days, and now the Early is working in very rich ore and running a five stamp mill. The Boston and Alaska Company is sinking a shaft on the Hunters bay mine.

ARIZONA.

F. B. Logan has the following to say of the Globe mines in the *Tucson Citizen*:

The Globe mines were first located and worked for silver only, but long since have developed into very rich copper producers. There were but five people in Globe when Dr. T. C. Stallo came in 1876, bringing with ox teams the first merchandise ever sold in Globe.

The Stonewall Jackson silver mine, near the site of Globe, owned by one Harris in those early times, became famous as the producer of a 1500 pound silver nugget.

Globe will now, more than ever, be a desirable place of residence, since it has ready communication by rail with the outside world.

A brief glance at the Old Dominion Copper Company's plant and operations may be of interest. The superintendent, Mr. Parnell, being absent, I was unable to secure but meager data of the workings. At the mine, from personal observation, I learned that the company was making numerous and important improvements and additions to their already extensive machinery. The whole hillside was strewn with lumber and casting material for various uses about the new machinery to be added. In the new machine and carpenter shop, a 22 inch drill press, a 6 foot planer, a new pipe cutting machine, with power to cut pipe from 2½ to 8 inches, and other improvements were noticed. * * *

E. H. Cook is the superintendent of the United Globe Mines, formerly known as the Buffalo Copper M. Co. Mr. Cook was also absent at the time of my visit, but through the courtesy of A. L. Waters, the metallurgist and smelter, I learned something of the present and prospective movements of this company.

The smelting ore now comes from the Black Warrior mine, but the company is developing the Hoosier group and the mines lying on the Globe ledge formerly worked by the Old Dominion Co., and developing four others on a parallel ledge. The improvements under headway and in contemplation are quite as extensive as those of the O. D. Co. above described. An electric motor will remove the slag from the three large furnaces, while the 3000 foot tramway, some time in use, delivers the ore from the mine to the smelters. A new

dynamo will soon be ready to furnish electric light all around the works. * * *

The Lost Gulch Gold Mining Co. and mines of the Webster gulch are spoken of with high confidence, as is also the Pinto mining district 18 miles west of Globe. The latter is a comparatively new district, but nevertheless considerable development work in it has been accomplished by Messrs. McNelly, Williamson, Siebert and Crowley, who own herein a group of six claims, running high in copper. A tunnel of 190 feet develops good copper ore and another tunnel of 180 feet cuts through a 38 foot ledge, and at the end of the tunnel a 36 foot gold ledge has been struck running from \$3 to \$5 in gold. A 28 foot ledge of copper on the Hal and Al claim running from 10 to 12 per cent. A 130 foot tunnel on the Dan and Mac mine has been run. A 60 foot extension, it is estimated, will reach the main copper lead. The mineral belt extends miles beyond and prospects well.

W. House and others have gold claims a few miles from Globe, with considerable development work exposing an 8 foot ledge of good ore, principally gold.

CALIFORNIA.

AMADOR COUNTY.

The Mechanics mine people, of Sutter Creek, are having a crushing of ore hauled to the Bullion mill. This ore is rich and yields plentifully in free gold as well as sulphurets.

Nothing is being done at the Centennial mine, at Drytown, except keeping the water out of the shaft. A good supply of material is already on hand, and we hope to see this property working in full blast again within the next few weeks.

An attachment on the Amelia mine, near Jackson, which was placed on it about the 1st of the month, has been released by bonds. The work on the property will now be pushed forward with the least possible delay and greatest economy.

Everything about the Pocahontas mill, Drytown, is getting into shape, and will be ready to run as soon as the water comes. A force of men, under the supervision of Charles Mitchell, of Sutter Creek, is laying the pipe and cleaning out the ditch from the Amador Canal Company's ditch, past the Bunker Hill and Gover mines. Everything about the mine is in perfect running order, and looks promising for the Pocahontas to become one of the paying properties in the near future.—*Amador Ledger*.

CALAVERAS COUNTY.

The McSorley mine, of Chili Gulch, is producing crystals which are shipped to New York and have proven valuable. Mr. Burton, under whose management operations were conducted, intends to resume his hunt for more, and operations to that effect will be commenced in the near future.

EL DORADO COUNTY.

G. Thomas & Co., are preparing to erect a five-stamp mill on their quartz proposition, three miles below Gold Hill. The mill site has been selected, and the necessary surveys run out by Henry Lahiff. Mr. Roberts, the superintendent, is now busy driving the tunnel to tap the ledge, which, when completed, will give him 100 feet of backs.

After having been closed down for several years, the entire plant at the Gopher-Bowl-

der, including the finely equipped electric plant on Rock Creek was started up again. The resumption of operations at this mine means much for Kelsey and El Dorado county.

KERN COUNTY.

The new dry-crushing and cyanide plant at Mojave is amongst the most complete west of the Rocky Mountains. The company has added many new features in the way of labor-saving inventions and improvements until it is brought up to the highest efficiency. Every advantage, to the smallest detail, is utilized, and works in perfect harmony on economical principles, even to the utilizing the water to the second and third time. The ore, which is mined and hauled four miles away, keeps up to its minimum average, \$27 gold and \$2 silver per ton. A. J. Morse, the secretary and superintendent, is a practical man and works on that basis.

A new free-milling Huntington plant, just completed and put into operation in close proximity to the cyanide works at Mojave, is having all it can do. It is owned by a Mojave company of local capitalists and business men.

The whole country around Mojave is attracting attention, and a new mining era is dawning with more than average stability.

Work on the new mill, of the Yellow Aster Company, was temporarily delayed on account of the non-arrival of the mortar blocks. These are twelve pieces of Oregon pine, 30x30 inches square and twelve feet long. There are six batteries and two of these blocks are to be used for each battery. The frames of the mill, engine room, ore bins and all, are in place and only await the corrugated iron with which the roof and the outsides are to be covered. The machinery is about all on the ground and the boilers are now being set up. The three iron water tanks are completed and the water connections made. The new forcing pump, to force the water through the pipes, is in place at the wells. The 30,000 gallon oil tank above the mill is completed, and if the blocks arrive in time, the mill will be running by the fifteenth of January as at first announced. The mines are looking better as development work progresses, and the last clean-up at Barstow for the month of November amounted to about \$47,000.

The Hard Cash.

The new mill at the Hard Cash is about completed and was started last week. Everything worked very nicely and the company feel confident. Much money has been expended by the owners of the Hard Cash in the erection of buildings which are of an excellent character, the engine room, mill house and concentrator house, being all separate and yet under one roof. They are all put up substantially and covered with shingles. A fine chute is built to connect with mine above and covered with corrugated iron, and everything is very complete and convenient.

The ore when hoisted from the mine is dumped into the chute and lands at the hopper at the mill. The mine is a tremendous body of ore easily worked, requiring no waste hoisting, as the vein is larger than the double compartment shaft which is down about 100 feet, where a drift is run to the south 100 feet more, showing no indications of running out.

It will require some days to have the mill running in complete shape, but it is expected

that by the first of next week everything will be in shipshape and the company beginning to reap some reward for their expenditure.—*Randsburg Miner*.

MARIPOSA COUNTY.

There was filed in the United States Circuit Court, December 8th, an important mining suit, involving property worth over \$3,000,000. The disputed lands are located in Tuolumne and Mariposa Counties. The Merced Gold Mining Company, a Montana corporation, is the complainant. The accredited respondents are David Dorward, C. M. Dabney and Daniel Corcoran of Coulterville, Mariposa County, and they appear as the representatives of the Rosenfelds and other San Francisco capitalists.

TUOLUMNE COUNTY.

The famous Black Oak mill is soon to have its crushing capacity increased one-third, by ten additional stamps. It is generally understood that grading and other preliminary work will be in action in a few days, and that it will be done in such a way that if, later on, they desire again to add ten stamps more, it can easily be carried out. We hope and expect that we may, ere many months, record in our columns that the Black Oak is adding the ten stamps that will make it a forty stamper.

COLORADO.

Cripple Creek Production.

The managers of the various treatment plants handling Cripple Creek ores report as follows:

Gillett Reduction Works treated 2,600 tons, averaging \$26. A gross value of \$67,600.

Colorado Ore Reduction Company, Arequa gulch, 2,400 tons, average \$28. Total \$67,200.

Brodie Mill, Mound City, 1,850 tons, average \$22. Total value \$40,700. The above figures are estimated on the month's output, no figures being obtainable in the absence of managers.

Metallic Extraction Company, Florence, 9,500 tons, average \$30. Total \$190,000.

El Paso Reduction Company, Florence, 3,100 tons, average \$25. Total \$77,500.

Colorado-Philadelphia, Colorado City, 7,000 tons, average \$30. Total \$210,000.

The small treatment plants, tonnage unknown.

Smelting ores, 10,700 tons, with an average value of \$73.50. Gross bullion value, \$786,450.

Summarized the totals stand:

Plants.	Tons.	Value.
District mills (3).....	6,850	\$ 175,500
Florence (2).....	12,600	267,500
Colorado City (1)	7,000	210,000
Small plants.....		17,500
Smelters.....	10,700	786,450
Grand totals.....	37,150	\$1,456,950

The New York Tunnel and Mining Company is a corporation that is not heard very much about, but for all that, it is a substantial one and one which believes in doing lots of work.

The company owns a tunnel site at the head of Squaw gulch, and during the past few years it has pushed the bore into the hill a distance of 1,200 feet and over. Numerous

veins have been cut in the process, but very little prospecting on them has been done, the management being anxious to push ahead. A vein is now, however, being drifted upon, and the outlook is said to be encouraging.

The New York Tunnel Company stockholders have just held their annual meeting. There was a very good representation of stock, and at this, and the subsequent directors' meeting the following officers and directors were elected: J. J. McCarty, president; John Bridge, vice president; J. W. Campbell, secretary and treasurer; J. C. McKenna, superintendent; and R. T. Fahey.

The treasurer's report showed that over \$4,000 had been expended in pushing the tunnel ahead during the past twelve months, and that considerable development work had been done. The company has money in the treasury and is in a prosperous condition. It has secured leases on some of the most desirable properties under which its tunnel passes and where the showing is said to be very good. The work of the past month is said to be the most encouraging in the history of the company, and from the present showing it would not be unreasonable to expect a new producer to be opened up any day.—*Colorado Springs Mining Investor*.

GEORGIA.

Our correspondent at Dahlonega writes: The mining excitement here continues unabated; many new people are coming in to examine the mines and many of them invest. If this section was 100 miles north of Klondyke, in an inaccessible place, it would require a standing army to keep the people away from here, from the reports that could honestly and fairly be made.

IDAHO.

The Florence *Miner* reports rich strikes in the Good Enough, Iola and Little Giant mines, near Warren. The Good Enough has a solid body of \$40 ore six feet wide, in the stope about 35 feet above the lowest workings. The Good Enough mill has been running about five weeks and a very satisfactory clean-up was made in the first month's run.

The Iola ledge is increasing in size and richness with depth, there being five feet of ore in the lower workings that will average \$60 per ton. Picked specimens have assayed as high as \$22,000. Thirty-five men are employed at present on this mine and the mill is running night and day.

The Little Giant mine is developed to a depth of 300 feet and has a pay shoot that runs from \$200 to \$20,000 per ton, the free gold being visible all through the ore. This mine does not employ a very large force of miners and the output is not large, all owing to a fanciful idea of the owner, which is not in the interest of a greater amount of production.

Hiyu Has Resumed.

The Hiyu mine, near Florence, has resumed operations and is at present working a force of about fifteen men. A. D. Wheeler, an expert mill man from Greenwood, B. C., has the management of the property, and is at present putting the mill in repair. The mill will start up in a few days and run through what ore is in the bins.

The work of sinking the shaft 200 feet deeper will commence in a few days. A new pump and piping has been purchased and is now on the ground.

MINNESOTA.

The amount of ore shipped over the Duluth, Misabe & Northern road and the Duluth & Iron Range, will be found in the following table published by the Duluth *News Tribune*:

Following is a comparative statement of the shipments from the mines on the Misabe road for 1897 and 1898:

	1898.	1897.
Franklin.....	200,273	30,128
Adams.....	390,770	175,800
Commodore.....	77,046	60,797
Lone Jack & M. Mt.....	385,792	601,072
Mountain Iron.....	650,021	773,538
Rust.....	38,385	.....
Burt.....	15,274	.....
Hull.....	75,851	.....
Pillsbury.....	79,691	.....
Ohio.....	65,579	.....
Sellers.....	112,763	.....
Biwabik.....	383,179	.....
Duluth.....	112,155	.....
*Lake Superior group.....	.....	259,910
Day.....	18,725	.....
	2,626,384	2,328,720

*The mines in the Lake Superior group are given separately for 1898.

Following is a statement of the shipments from individual mines on the Iron Range road:

	1898.	1897.
Minnesota.....	427,764	592,196
Chandler.....	715,857	438,366
Pioneer.....	123,183	207,103
Auburn.....	235,631	175,263
Norman.....	110,141	101,070
Fayal.....	575,933	642,939
Genoa.....	279,677	309,514
Sparta.....	226,154	66,720
Elba.....	564	.....
Sample Car.....	25	.....
Cincinnati.....	.....	32,720
Roberts.....	.....	18,614
Zenith.....	.....	40,817
Hale.....	.....	13,728
Cloquet.....	.....	12,215
Totals.....	2,693,929	2,651,265

MICHIGAN.

Calumet Dividend.

The Calumet & Hecla Copper Mining Company has declared a dividend, \$10, making \$50 for the present year, and \$55,850,000 in all. A very pretty showing.

Shipment Stopped.

Shipments of ore from Ishpeming mines have ceased, the Lake Superior being the last to stop. A cargo was needed for the Illinois Steel Company which required attention. Stock piles are well cleaned up, and prospects for the coming year are excellent.

Franklin Stamp Mill Burns.

The stamp mill at the old Franklin copper mine was destroyed by fire last week. It had been in constant operation for 38 years. There were three heads of stamps under which 14-ton anvil blocks had been placed during the past few years, which added to their former efficiency. The capacity was about 450 tons of rock in 24 hours.

This removes the last stamp mill from Portage Lake in the vicinity of Hancock and Houghton. The old mill was an expensive

one to operate, in that it had been impossible to arrange things in modern fashion. Many additions had been made to the original building, the ground under roof being considerable at the time of the fire.—*Iron Ore.*

MISSOURI.

Joplin Notes.

The Topsy mine at Lehigh has put in a 9-inch pump and is working and making good turnins.

The Sergeant shaft on the Snapp-Warren at Tuckahoe has struck a deep run of jack at 200 feet; they have a face of 20 feet.

J. L. Naulty has purchased eleven acres of the A. Mitchell land, adjoining the East Alba mines, and will prospect it for mineral.

Houk & Co., on the Chitwood Hollow Mining Land Co.'s tract have let the contract for a complete concentrating mill, to cost \$4,600.

In sinking the shaft, the Morning Star mine at Oronogo has encountered what is considered the richest run of jack in that camp.

The Old Hickory in Chitwood Hollow is running a prospect drift at 130 feet, and is opening up a good run of lead at 20 feet from the shaft.

In addition to the crusher and rolls put in at the Mascot on the Bailey lease, the owners, Geo. Redell and Chris Steinbach are figuring on putting in Star jigs.—*Joplin Herald.*

MONTANA.

H. L. Frank, who recently acquired a large interest in the famous Hope mine, of Basin, Jefferson County, has returned, after making a personal investigation of conditions at that property. He declared that he was more than surprised at the showing on the bottom level, and predicted that the Hope would yet be known as one of the great gold mines of Montana. Mr. Frank has been interested in mining for many years, and his judgment is generally accepted by mining men in mining matters. It yielded about three-quarters of a million dollars from the surface to the 300-foot level, and it is generally believed that nearly 50 per cent of the output was lost in the tailings and went into the creek, owing to the crude and imperfect method of concentrating.

"Up near the 200-foot level the ledge was only about six feet wide. Down at the 500-foot level, where the station is now being cut, the ledge is 24 feet wide, and the prettiest quartz ever seen in any state. In fact, it looks like a mountain of quartz and it carries good values too. If it only carried a value of \$5 to the ton in gold, it would be one of the biggest mines in the state, but an average assay will give better results than that. Six feet of this ledge is solid ore. It looks exactly like the narrow streak of high grade taken out above the 200, which netted the fortunate owners over \$600,000. There is about 1,000 feet of development work at the 300-foot level and about 800 feet at the 200, where they took out the rich ore a few years ago. There is yet fully 10 feet of ore in the hanging wall, as indicated by crosscuts made at different points.

"We are now cutting a station and putting in a pump at the 500. We will drift on the ore body to the Katy line, which will probably be about 30 days' work, and will then begin sinking to the 600. If the ore body at that depth is half as good looking as it is at

the 500, the company will begin work on a 500-ton concentrator, which we believe we will have in operation by July."

Work is being actively pushed on the Katy mill, at Basin, the frame work being nearly all in place. The large smelter across the river is nearing completion and when it is finished electricity will be used as the motive power and also for lighting the lower workings of the mine. There is some talk of the city being lighted from the plant. The stockholders of this property have recently increased the capital stock from \$600,000 to \$1,000,000.—*Helena Independent.*

NEVADA.

The Deep Mining Project.

Matters connected with the pumping of water from the Comstock mines is now assuming definite shape. The tank on the side of Mount Davidson, from which the water will be procured to work the pump, is now up and will be ready to receive the water in a few days. The repairs to the pipe leading to the C. C. shaft are almost completed, and the Virginia and Gold Hill Water Company is repairing the ice house at the five-mile reservoir, where they will store ice this winter with which to supply the mines next summer. To add to the general activity in connection with deep mining, miners have been put to work to repair the C. C. shaft.

The stockholders of the Holmes Mining Company, of Candelaria, Esmeralda County, Nev., by a unanimous vote of more than two-thirds of the capital stock, have authorized the directors to create a bonded indebtedness of \$175,000, with which to pay the existing indebtedness of the company and provide funds for resuming work in the mine. English capitalists have agreed to take the bonds.

NEW MEXICO.

Output of Hillsboro Mines.

Output of Hillsboro gold mines for the week ending Thursday, Dec. 8, 1898, as reported for *The Advocate*:

	TONS.
Wicks.....	40
K. K.	35
Richmond	65
Snake Group.....	85
Opportunity.....	35
Sherman.....	10
Cincinnati.....	30
Trippe.....	90
Rex (silver-lead)	16
Eureka.....	10
Freiburg.....	15
Total.....	431

Total output since January 1, 1898—9,581.

OREGON.

The huge dredger of the Griffith & McDevitt Construction Co., of Chicago, has begun work on the gravel beds of John Day River, in Grant County. The machinery handles 2000 yards of dirt every 24 hours. Two shifts of five men each are employed and the dredge is operated day and night. A 50-light capacity dynamo has been placed on the boat and it presents a pleasing spectacle at

night. The company has several dredgers under construction, one in Montana, another in Utah.—*Oregon Mining Journal.*

One of the most important events in mining in the Cracker Creek district that has occurred for some time was the strike made a few days ago in the E. & E. mines.

From a reliable source it is learned that on the 300-foot level of the Excelsior in the north drift, a vein of one and one-half feet of ore gives returns by assay of \$312 to the ton. The full width of the ledge in the drift is seven feet.

In the Excelsior No. 2 tunnel, also, a five foot ledge has been uncovered in a drift that assays \$30 to the ton.

SOUTH DAKOTA.

Rapid City Chlorination Works.

The Rapid City, South Dakota, Chlorination Works started up last week for a trial run on ore from the properties of M. H. Day. Since the plant has passed into the hands of Mr. Day many alterations and improvements have been made in it, and it is now one of the best appointed institutions of the country.

Black Hills Notes.

Quartzite is said to have been struck in the Chicago & Two-Bit shaft, in Two-Bit, at a depth of 500 feet.

The steel hoist over the Deadwood-Terra shaft is nearly enclosed. It will be completed about the first of the year.

A good body of ore is said to have been discovered, on ground owned by L. P. Jenkins, H. T. Bigler and associates, of Lead, in Strawberry.

John L. Scofield has put a force of men at work on the Aurora group of claims, in Ice Box Canyon. The property is owned by Deadwood parties.

The Faust & May shaft, at Garden City, has been emptied of water, and everything is in readiness to commence sinking. A new pump was put in this week.

General John Walker has purchased the quarter interest in the Morrow lease on the Dakota Maid property, which was owned by Messrs. Secoy & Shaw. The purchasing price was \$2,000.

UTAH.

W. S. McCornick, the Salt Lake City banker, has secured a third interest in the well-known Ajax mines of Mammoth, having bought Samuel McIntyre's interest.

It is reported that Bullion Beck Company's mines at Eureka are again in good ore on the 1400 foot level. The regular dividend of 10c. per share, of \$10,000, was paid on the 15th of December.

The gold, silver, copper and lead property of Eureka also paid a dividend on the 15th of December, amounting to \$15,000. The last dividend was paid in March, 1897. The mine is said to be in excellent condition—a new ore chute having been opened up, and this may prove to be the equal of any found in the palmy days of this bonanza.

The Buckeye Company of Tintic announces the resumption of ore shipments from their well known properties.

Work is being pushed steadily at the Alliance mine near Park City, but there is no

change in the character of the ore. Good reports reach Salt Lake City from the Anchor property, also at Park City, in the form of an increase in the ore values.

Matters look much brighter at the Chloride Point mine, near Mercur, in the Camp Floyd district. The mill tonnage is being increased and the savings are high.

Developments at the Galena mine, in the Fish Springs country, are being rapidly pushed ahead, and the mine is in a better condition at the present time than for a year past.

Reports continue to come in of a strike of rich ore at the Mammoth property, located near Mammoth, Utah.

WASHINGTON.

Patrick Clark, of Rossland, says: "Republic is a new camp. It differs from the Rossland camp in a good many ways. This is true as to the character of its ores and the formation. There the ore is of the cyaniding variety and carries no copper or other base metal. The values are principally silver and gold, mostly the latter. The cost of reduction in both camps is about the same, but when we have a railway it will be cheaper. The ore in Republic is not of much higher grade than is found in Rossland mines. There is this difference, however, that at Republic the ore can be treated on the ground, which is some little advantage. The greatest drawback that we have in the way of more economical extraction of the ore of Republic is transportation facilities. Rossland is well supplied now with transportation facilities, which was not the case when I first came here. We expect that we will have railway transportation at Republic next year. I think we will have a city at Republic about the same size as Rossland. For its age, Republic has done well to have one good dividend payer in 18 months. There will be others in my opinion that will be dividend payers inside of a year. None so far, however, have as high grade as the Republic.—*Spokane Miner and Electrician.*

FOREIGN MINING NEWS

BRITISH COLUMBIA.

GOLDEN.

At the annual meeting of the Northeast Kootenay Miners' Association, held at Golden last week, the following officers were elected: President, Hon. F. W. Aylmer; vice-presidents, Golden mining division, W. G. Mitchell-Innes; Windermere mining division, J. L. Mackay; Donald mining division, W. G. Neilson; secretary-treasurer, E. A. Haggen; committee, Messrs. M. Dainard, H. G. Low, W. McNeish, C. Cartwright and H. G. Parsons.—*British Columbia Mining Critic.*

FORT STEELE.

New machinery has been placed on the mines of the Sullivan Group Mining Company. There has been opened up a vein 100 feet wide between walls showing 65 feet of clean galena. In a crosscut on this ore body an average assay of \$70 in silver and lead was obtained. In a test pit sunk on the Coye at a point about 100 feet north of the shaft, galena of much higher grade has been found.

ROSSLAND.

Superintendent Jack Hanley says that be-

fore spring he will develop the Bonanza mine into as valuable a property as the Le Roi. Besides the immense ore bodies already opened up, the miners are just penetrating in the 500 foot level a larger and richer ore chute than ever, and from now will ship three carloads a day. It is Mr. Hanley's intention to continue sinking until the 1000 foot level is reached, and hopes to have this depth by next spring.

MEXICO.

The famous old Santa Eulalia mine, near Chihuahua, which had its shaft burned out some months ago, has been thoroughly repaired and refitted, and the mine is now turning out large quantities of high-grade ore, as it did 300 years ago.

Enrique C. Creel and his Chihuahua associates have sunk a shaft 120 feet deep, at their La Alianza property, five miles from Chihuahua. This is regarded at Chihuahua as one of the most valuable mines in the state. It is located on ground that has been gone over for hundreds of years, and no one dreamed of denouncing it until recently.

F. M. Aizpuru, a large manufacturer of iron at Jalisco, Mexico, says *Modern Mexico*, also owner of very valuable iron mines, known as the Providencia, reports that some \$50,000 will be expended on new machinery for his plant. The work of remodeling will be in charge of Capt. A. Evans, Jr., of Pittsburg. At present, the mills turn out all kinds of iron, except rails and beams, but the mines in connection produce Bessemer ore, and steel manufacture is to be introduced.

The water has been pumped out of the Ahogado mine, near Hermosillo, Sonora, and the owners have started to sink the shaft to a greater depth and open up new workings below. This promising property is owned by a company of which James McNab of San Francisco is president, George J. Wanless of Hermosillo is general manager, and J. D. McGilvray superintendent.

Prof. E. T. Dumble, the geologist, who has returned to Sonora to explore and test the Barranca coal field in the interest of the Southern Pacific Company, has gone to the scene of his labors, reaching La Barranca early in the present week. The exploration force numbers two engineers and more than fifty workmen of various kinds, with a splendid outfit of tools and implements for the work in hand. It is anticipated that about fifty laborers will be employed several months in sinking shafts, running tunnels, etc.—*Nogales Oasis.*

GENERAL NEWS.

Horace F. Brown, M. E., patentee of Brown's Complete Automatic Mill Process, Brown's Horseshoe Roasting Furnace, Brown's Chloridizing Furnace, Brown's Cooling and Conveying Hearth, and Brown's Pulp Distributor for Leaching, is now located at Victor, Colorado. He is putting in a very large plant there, nearly 600 tons daily capacity, for the Economic Gold Extraction Co., and Mr. Brown believes it will bear out the name and says he will have an automatic milling plant that will be more economical than any other in the country.

STEAM BOILER HEATING SURFACE.*

(BY CHARLES WHITING BAKER.)

*Paper presented at the Niagara Falls meeting (June, 1898), of the American Society of Mechanical Engineers.

(Concluded from our issue of Dec. 15.)

It is very easy to understand why water should have so much greater heat-absorbing power than air. The specific heats of water and air are as 1 to 0.23 for equal weights; but since air at ordinary temperatures weighs only 1-812 as much as an equal volume of water, if we consider a thin film of air in contact with a hot surface and a film of water of equal thickness and area in contact with a similar hot surface, the water would absorb 3,530 times as much heat as the air if the temperature of each were raised an equal amount. Again, the relative heat conductivities of water and air, according to Lord Kelvin, are as 40 to 1. On the other hand, in the transmission of heat from a surface to a fluid, the mobility among the particles of the fluid, whereby fresh portions of it are constantly brought in contact with the surface, is a matter of great importance, and in this respect air, of course, has a considerable advantage.

The writer has been unable to find any trustworthy figures for the relative heat-absorbing power of air and water; and the practical importance of their accurate determination would be trifling, for we know in a general way and from the examples already cited that water absorbs heat very many times more rapidly than air, so many times that in the case of a thin plate, such as a boiler tube, transmitting heat from furnace gases on the one side to water on the other, we can be quite certain that the temperature of the metal plate is at most only a few degrees warmer than the water in contact with it.

In other words, in any steam boiler with clean heating surfaces we can assume the temperature of the fire side of the heating surface to be practically the same as that of the water in the boiler. Perhaps it may be 1 degree more; perhaps it may in some cases be 20 degrees, or possibly 30 degrees more. The difference is of no practical importance, since in the few cases where so large a difference as 20 degrees or 30 degrees may possibly exist, the temperature of the fire to which the surface is exposed is greater by probably 2,000 degrees or more than the temperature of the plate.

If, now, it is clear that the fire side of the boiler tube or flue is at practically the same temperature as that of the water in the boiler, the reader will have little difficulty in comprehending that this surface, and not the surface on the water side, is the real heating surface of the boiler, which measures its capacity of making steam.

The great resistance to the flow of heat in any steam boiler is in getting the heat from the hot gases into the surface exposed to them. Compared with this, the resistance to the passage through the plate and the resistance to the passage from the plate into the water are mere trifles. If we increase the surface exposed to the hot gases, we shall increase the capacity of the boiler to absorb heat; but if we leave the surface the same and increase the surface exposed to the water, the amount of heat transmitted in a given time will be practically the same.

The case can be made more clear perhaps by an analogy to the flow of water through the pipes. If we have a length of 1-inch pipe connected to two lengths of 12-inch pipe, and allow water to flow through them under a head, it is clear that the flow will be determined by the resistance of the 1-inch pipe

If we enlarge that, we shall enlarge the flow; but if we leave that alone and enlarge either or both the 12-inch pipes, the flow will be practically unchanged.

The area of the fire side of the tube is what determines the heat-absorbing power and the steam-making capacity of the boiler. If we can cause this to take up more heat in any way, we shall increase the power of the boiler. The *Serve* tube, with its ribs extending into the hot gases, increases the interior surface of the tube, and thus its capacity for absorbing heat. If, however, instead of putting ribs on the fire side of the tube, we put them on the water side, we increase the surface exposed to the water, but we make no increase of any practical importance in the amount of heat transmitted. In a similar way, the curved form of the tube, which causes the surface exposed to the water to be greater than that exposed to the fire (in fire-tube boilers), effects no increase in the amount of heat transmitted. The real heating surface, which determines the amount of heat transmitted, is the surface exposed to the fire.

In the preceding discussion it has been supposed that the heating surfaces were clean on both sides. As a matter of fact, heating surface is almost invariably more or less coated with soot or ash on the fire side and with scale on the water side. If the preceding discussion has been carefully followed, it will be clear that the transfer of heat will be much more interfered with by the deposits on the fire side than by deposits on the water side. To use again the analogy of the water pipes, a half-closed valve in the 1-inch pipe would have far more effect than a half-closed valve in the 12-inch pipe. It is no part of the purpose of this paper to excuse lack of care in keeping boilers free from scale; but it is nevertheless quite certain that a thin scale on boiler tubes does not interfere in any noticeable degree with the capacity or economy of a boiler, while the coating of the fire side of the tubes with a flocculent deposit of soot does certainly interfere in a marked degree with a boiler's steam-making capacity. Of course, a thick scale on the water side of the tubes or other heating surface, or any other material which acts as a non-conductor, may considerably obstruct the flow of heat. If it does this, the temperature of the heating surface itself will at once be raised, and may reach a point, as happens sometimes with the shells of externally fired boilers and with the furnaces of marine boilers, where the metal may be so heated as to bulge or buckle.

Another deduction of practical importance from the fact just set down, is that so far as the transmission of heat after the boiler is making steam is concerned, the circulation of the water in boilers is of a good deal less consequence than has been sometimes claimed. I do not mean by this that it is not worth while to make proper provision for circulation. There are possibly some parts of boilers worked with forced draft, such as the tube-plates of marine boilers, where it is so difficult for the steam bubbles to get away fast enough, that we have a mass of foam instead of water in contact with the plate. Under such conditions, of course, the plate is bound to be heated; but I know of no evidence that this is any other than a rare occurrence, even in boilers which are pushed most severely. If anyone is inclined to stick to the old hobby that circulation is of great importance to economy, I advise him to consider the conditions in the narrow water space (about $3\frac{1}{2}$ inches wide) around a locomotive fire box, where the steam rushing up is directly op-

posed by the water going down. Let it be understood that I am referring to circulation only as affecting the transfer of heat and the consequent economy and capacity of the boiler. Good circulation is desirable to prevent unequal heating of the boiler, and consequent straining, and it may be of service in preventing deposits of scale and mud in places where they are least desirable; but that it has any appreciable effect on economy and capacity is not proved, and probably cannot be.

It has been demonstrated above that the surface exposed to the fire is the real heating surface of a steam boiler. Is there any good reason why this should not be generally adopted by engineers as the correct, and the only correct, method of computing heating surface?

The following are some reasons, good or bad, which are likely to be urged against it.

1. The makers of fire-tube boilers will claim that this gives the water-tube boiler makers an advantage. With the same number of tubes in a boiler, of the same length, the water-tube boilers can show 7 to 11 per cent. greater heating surface. This is of course true; but is it not an advantage to which the water-tube boilers are fairly entitled?

It must be remembered that nowhere in this discussion has it been claimed that there was any fixed heat transmitting value for heating surface. On the contrary, it is entirely certain that a square foot of heating surface in one type of boiler may have double the heat transmitting power of an equal area in another.

Again, the relative facility with which heating surface can be cleaned of soot and ash counts for a vast deal, more than most steam users are accustomed to think. It certainly seems that the makers of fire-tube boilers have enough valid arguments to offer for their product without demanding the privilege of overstating their heating surface by 7 to 11 per cent.

2. Another argument offered for the use of the exterior surface as the heating surface is that this makes a given boiler show a larger heating surface than if the interior were taken. However much the argument may appeal to boiler manufacturers—and I hardly think they will take it very seriously—it deserves no weight with engineers. A foot rule is no longer for calling it 13 inches.

3. It is urged that practice is and has in the past been fairly uniform in accepting exterior area as the heating surface, and it is best to stick to a uniform practice, even if it be in error, than to change. If the practice were actually uniform, there might be reason in this argument; but while the majority of engineers probably use the exterior surface of tubes in computing heating surface, there is a very respectable minority which insists on the correct method of computation, and this minority shows no signs of decreasing.

4. As the outside diameter of the tube is even inches and the thickness of tubes varies, it is easier to compute the exterior heating surface than the interior. Probably this is one of the principal reasons why the outside surface has so frequently been taken; but in these days of tables and pocketbooks and aids to computation, so trifling a matter as computing the interior area of a tube ought not to be an excuse for perpetuating an error. As a matter of fact, it will generally be less labor to do this than it is to figure the cost of the tubes with the numerous series of discounts which are frequently found on hardware bills in these days.

KANSAS LEAD AND ZINC.*

The only locality in the State which has ever produced lead or zinc ores in paying quantities is the extreme southeast part of Cherokee county. Here the ores of each of these metals exist in phenomenal richness.

HISTORICAL.

It was in April, 1876, that the first discovery of lead ore was made in the county. For years similar mines had been in operation at Joplin and Granby and adjacent points in Missouri. In general character the surface rocks in this part of Kansas were known to be the same as those which produced the ores in Missouri. Different parties had prospected here and there up and down the little creek called Short creek, but nothing of value had been found. In April, 1876, while digging a hole, ostensibly for a well, on the farm belonging then to a Mr. Harper, a well digger was fortunate enough to come upon a mass of the purest lead sulphide (galena). No sooner was the fact noised abroad than different companies applied to Mr. Harper for the purchase of his farm, offering what seemed to be fabulous prices. Finally a company, composed principally of gentlemen from Baxter Springs, procured the land and immediately began prospecting for ore. Mining lots and town lots were surveyed, mining leases let, and temporary buildings erected, forming the new town which was rapidly springing into existence, and which was known as Bonanza, a name still borne by that particular locality.

Mining operations, however, were prosecuted slowly during the summer, largely from the fact that but few rich deposits of ore were found. The rapid growth of the village during the first few months gradually became checked, and twelve months from the time of the discovery there were perhaps fewer people living there than at the end of the first sixty days after the discovery was made.

In the spring of 1877 the same prospector, while digging in Short creek valley about a mile above Bonanza, came upon a large body of pure lead ore which produced hundreds of dollars' worth of the ore. Again the excitement was renewed. Land was purchased; mining lots surveyed and leased; town lots bought and sold; and the narrow valley of Short creek soon changed from the quiet corn field of a farmer into the busy scene of activity and turmoil known only to few mining towns of the world. Almost every shaft that was sunk found large quantities of lead ore near the surface. Two rival town companies came upon the scene, one of which got control of a considerable part of the land on the south side of the creek, and named the town Galena; the other of which controlled the greater part of the exceedingly productive valley and the upland to the north. This company named its town Empire City. The story of the remarkable development of this area has been told in many newspapers from that time. It now sounds almost like a fairy tale; yet the same men who took part in the development of the mines and the establishment of municipal government in this little Short creek valley in 1877 still are living on the ground they then purchased, many of whom have become prosperous beyond the limits of reasonable hope in those early days. It is estimated that within three months from the discovery of ore in this second locality not less than twelve or fifteen thousand people had camped upon the grounds.

The first mining operations were crude in

*From the Annual Bulletin on Mineral Resources of Kansas for 1897, by Erasmus Haworth, Professor of Physical Geography and Mineralogy, University of Kansas, Lawrence, Kansas.

method and detail. The lead ore was found near the surface, so that but little hindrance was met with by water in the shafts. Chaos reigned supreme in local government. No one attempted to keep accurate account of the output of the mines, so that it will always be a matter of conjecture regarding the first few months' or even few years' operations. This chaotic tendency was increased by the mutual jealousy of the two town companies and the discord which resulted.

It was only a short time, however, until matters assumed a much more quiet and substantial form. Regular mining companies were organized; each controlled the properties belonging to it and conducted its operations in a systematic manner. The income from the ores brought vast sums of money into this country from the outside. Thousands of people were entirely dependent upon the success of the mines or upon the wages for a day's labor. The citizens of the adjacent farming communities soon learned that they also were to be greatly benefited by the development of the mines, for a strong and steady demand was supplied for all of their products, and was brought almost to their very doors. Of the millions of dollars received for the lead ores and the zinc ores sold from Galena, a large portion has been immediately distributed throughout the farming communities near by. In this way, beneficial results have reached the whole community.

(To be Continued.)

PERSONAL NEWS ITEMS

EDWARD DITTMAN, a Mexican mine owner, is in San Francisco, Cal.

W. G. LUMMIS the mining man of St. Charles, Bear Lake county, Idaho, is now in Republic Camp, Washington and writes that Republic camp is "a dandy."

GEO. H. ROBINSON, the well known mining engineer of Salt Lake City, Utah, was in Basin, Montana, examining some promising mining properties. The old Hope mine among others coming under his observation.

H. SHALLENBERGER, of Spokane, who is extensively interested in the Boundary creek, B. C. district, is getting together a representative collection of the ores of the district which will be taken to Scotland by another party who will go across the water soon to interest Scotch capital in the Boundary country.

J. SELDEN and J. H. FREDERICKS, representing the J. Geo. Leyner Machinery Co. of Denver, Colo., is now in the state Michoacan, Mexico, putting up a plant on the Inguaran Copper properties in that State.

HON. E. W. MILLER, of Elk Point, S. D., well known in both the eastern and western parts of the state, arrived in Deadwood, S. D. Mr. Miller will remain some time in the Hills, and will pay considerable attention to his mining ground in Grizzly gulch.

RICHARD M. JESSUP of New York has a position with the Gold Coin Mines Company and Gregory Consolidated Mines Company, Gilpin County, Colo.

JOSEPH L. GIROUX, manager of the big mines at Jerome, Arizona, the United Verde Co's properties, is at present in Hermosillo, Sonora, Mexico, on important mining business.

After a sojourn of several days in Denver, Col., M. H. DAY has returned to the Black Hills, S. D. He went to Denver for the purpose of engaging the services of one or more men to take charge of the new chlorination works, at Rapid City.

It is a well known fact that when the Jos. DIXON CRUCIBLE Co., does anything they always do it in first-class style. They have been making Christmas presents and the same rule applies here too. We can attest to the fact. A package containing an assortment of Dixon's "American Graphite" Pencils was received at this office as one of their presents, having been selected specially for editorial purposes, and for which we herewith extend our most sincere thanks. The Dixon pencils are well known for their superiority.

GEORGE KISLINGBURY has returned to Utah from British Columbia.

W. KREUGEL, of Detroit, Mich., is in Central City, Colo., to look after his interests in the Alpha Gold Mining Company.

HARTWIG A. COHEN, who has recently resigned the general management of Captain J. R. De La Mar's mining enterprises is in New York where he has opened an office as mining engineer.

DR. GEORGE W. MAYNARD, a New York mining engineer, is in California in the interest of a foreign mining syndicate.

SAM T. JONES, a brother of Senator John P. Jones of Nevada has been recently visiting various points in Sonora, Mex. Last week he was out to see Colonel W. S. Morrow's properties at Mesaquemada, about thirty miles southeast of Minas Prietas.

FRANK NICHOLSON, having completed his engagement as general manager of the Consolidated Gold Fields of Mexico, Limited, at Santa Elena, Mexico, has returned to New York, where he will establish an office as consulting mining engineer and metallurgist.

F. AUG. HEINCE is in New York on what purports to be most important business. It is said that on his return to Butte, Mont., he will, in all likelihood, assume the management of the Butte & Boston Co.

MARSHALL P. WRIGHT of Kansas City is south of Matape in the Ures district of Sonora, Mexico, where he has recently denounced some very promising properties he is preparing to work on an extensive scale.



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Acids.

Spot business is only fair, while for next year's delivery a few more contracts have been booked. Oxalic acid has been reduced by the syndicate to 6½¢; thus the jobbers who have bought heavily at 6½¢. are now in a predicament.

Quotations are per 100 lb from New York and vicinity as follows: Acetic acid, commercial, No. 8, \$1.40@1.50; muriatic acid, 18°, \$1.10@1.75; 20°, \$1.20@1.87½; 22°, \$1.35@2.25; according to quantity and brand. Nitric acid 36°, \$3.50@4.75; 38°, \$3.75@4.62½; 40°, \$4@4.87½; 42°, \$4.62½@5.25. Oxalic acid, \$6.50@6.75. Mixed acids, according to mixture. Sulphuric acid, 66°, \$1.10 for drums and \$1.15@1.75 for carboys. Chamber acid 50°, in jobbing way, \$11.50@12 per ton f. o. b. factory. Blue vitriol \$3.50@3.62½ for extra grades and \$3.37½ for ordinary.

BRIMSTONE.

The market has eased off on the arrival of 2,400 tons, and spot best unheated seconds can doubtless be had at \$21 per ton, while futures are obtainable at \$19.50@20 per ton. Thirds are nominal at \$18.50@90. The shipments of brimstone from Sicily to the United States in November, were 7,300 tons.

NITRATE OF SODA.

Buyers and sellers of nitrate of soda are still to far apart to come to any large sales, though about 5,000 bags were sold recently at \$1.52½ per 100 lbs. Sellers are quoting cp to \$1.55 for spot, and for futures extending through December, 1899, \$1.55 to \$1.57½ per 100 lbs.

FINANCIAL NOTES.

Average Prices of Metals

in New York per pound from January 1, 1898:

Month	Copper	Tin	Lead	Spelter
January	10.99	13.87	3.65	3.96
February	11.28	14.08	3.71	4.04
March	11.95	14.38	3.72	4.25
April	12.14	14.60	3.63	4.36
May	12.00	14.52	3.64	4.37
June	11.89	15.22	3.82	4.77
July	11.63	15.60	3.95	4.66
August	11.89	16.23	4.00	4.58
September	12.39	16.53	3.99	4.57
October	12.41	17.42	3.78	4.98
November	12.86	18.20	3.70	5.29
December				

Average Monthly Prices of Silver.
In New York per ounce Troy, from January 1st, 1898, and for the years 1897 and 1896:

Month	1898	1897	1896
January	66.77	64.79	67.18
February	66.07	64.67	67.67
March	64.90	63.06	68.40
April	66.02	61.85	67.92
May	66.98	60.42	67.78
June	68.61	60.10	68.69
July	69.06	59.61	68.75
August	69.64	59.19	67.34
September	69.68	58.24	65.68
October	69.62	57.87	66.05
November	69.60	57.91	64.93
December		58.01	65.24
Year		59.79	67.75

The statement of the United States Treasury, on Thursday, Dec. 8th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Dec. 1.	Changes.
Gold	\$244,088,719	I. \$2,425,276
Silver	6,842,551	I. 109,110
Legal Tenders	14,973,531	I. 217,561
Treas'y Notes, etc.	1,057,619	I. 354,179

Totals.....\$266,961,420 I. \$2,997,768
Treasury deposits with national banks amounted to \$96,389,061, an increase of \$1,748,060 during this week.

Gold and Silver Exports and Imports.
At all United States ports, October 1898, and year from January 1st, 1898 and 1897:

OCTOBER.

	1897	1898
Gold—		
Exports	\$13,311	\$1,279,926
Imports	11,775,483	16,227,358
Excess	I. \$1,464,172	I. 14,947,432
Silver—		
Exports	\$5,225,437	\$4,572,827
Imports	3,283,433	2,532,797
Excess	E. \$1,942,004	E. \$1,980,030
TEN MONTHS.		
Gold—		
Exports	\$32,989,892	\$14,051,849
Imports	28,386,318	143,658,095
Excess	E. \$4,603,574	I. \$129,596,246
Silver—		
Exports	\$47,812,111	\$34,946,377
Imports	27,164,680	24,924,164
Excess	E. \$20,647,431	E. \$10,022,163

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

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MINING MAN of experience will develop Gold property of merit for ¼ interest, or will bond whole mine and develop. Correspondence with owners only. Give full particulars. Will give satisfactory references. Address P. O. Box 887, Los Angeles, Cal.

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4-STAMP, 650 lbs, with plates, feeders, etc., on cars free, \$400, condition guaranteed; Engine and boiler, new, \$250; also 2-stamp Llewellyn Mill; 2-stamp Fulton Engine Works; and 10-stamp Mill with concentration and power cheap; condition guaranteed; also 4-stamp mill complete; PARSONS & HAWKINS, 247 Wilcox Bldg., Los Angeles

A COMPLETE 20-stamp mill and equipment including assay office outfit, see ad page 24. Address: BOX 234, LORDSBURG, N. M.

WELL DEVELOPED Quicksilver property located in Western Texas. Has produced 4000 pounds of quicksilver. Address: LOUIS LINDHEIM & Co., Del Rio, Texas.

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BELL'S California Mining Location Notices conform to the mining laws of California and the United States. Mailed for fifty cents per dozen. J. BELL, Publisher, Los Angeles, Cal.

ANTIMONY BISMUTH PROSPECTORS having locations of this nature and wishing to sell at once for cash, will do well to address with full particulars, P. O. Box 2078, SAN FRANCISCO, CAL.

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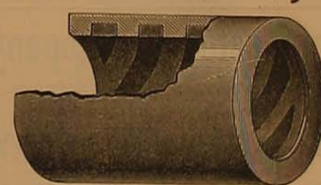
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BOSTON	
Aetna Con.	4.00
Allouez	5.13
Arcadian	39.38
Arnold	12.75
Ash Hed.	2.25
Atlantic	32.50
Baltic	28.00
Bonanza	1.27
Boston & C. C.	42
Boston & Mont.	240.00
Breece	1.00
Butte & Boston	68.50
Calumet & Hecla	610.00
Catalpa	25.00
Centennial	26.00
Crescent	16
Dominion Coal	33.00
Dominion Pref.	116.50
Franklin	18.75
Gold Coin	3.88
Humboldt	23.75
Koyale Con.	5.50
Lake Sup. Iron	—
Napa	—
New Idria Mg.	—
Old Dominion	34.38
Oscoda	73.00
Parrott	28.00
Pioneer	4.38
Quincy	136.00
San Isabel	6.00
Tamarack	171.00
Tecumseh	8.75
Victor	5.50
Washington Ming	138
Wolverine	32.60

ROSSLAND, BRITISH COLUMBIA	
Alecta	10
Big Three	15
Butte	04
Caledonia Con.	05
Colonna	28
Commander	12
Deer Park	19
Enterprise	18
Eureka Con.	05
Evening Star	05
Georgia	02
Gertrude	12
Good Hope	02
Grand Prize	09
Great Western	09
Hattie Brown	12
High Ore	02
Iron Mask	78
Iron Colt	10
I. X. L.	10
Josie	30
Josie Mac	45
Jumbo	47
Le Roi	7.50
Lilly May	18
Mayflower	08
Monita	14
Monte Christo	13
Morning Star	08
Mugwump	03
Nest Egg	03
Northern Belle	04
Novelty	04
Palo Alto	02
Phoenix	08
Poorman	12
Red Mount. View	01
Rossland H'mest'ke	05
Silver Bell	05
St. Elmo	05
War Eagle Con.	2.98
White Bear	07

SAN FRANCISCO	
Alta Con.	12
Andes	13
Belcher	21
Best & Belcher	16
Bullion	10
Caledonia	10
Challenge	13
Chollar	10
Confidence	40
Con. Cal. & Va.	83
Mexican	15
Occidental	52
Ophir	50
Overman	07
Ottawa	30
Plymouth	50
Potosi	23
Quicksilver	1.25
Quicksilver pref'd	4.00
Savage	15

Crown Point	10
Deadwood	45
Gould & Curry	18
Hale & Norcross	85
Homestake	50.00
Iron Silver	86
Justice	03
Sag. Belcher	30
Sierra Nevada	64
Silver Hill	10
Standard	1.75
Union Con.	18
Utah	06
Yellow Jacket	15

COLORADO SPRINGS STOCKS	
Acacia	02
Aldon	02
American Con.	01
Anaconda	37
Argentum Junata	20
Banner	01
Bob Lee	01
Creede & C.	01
Dante	04
Des Moines	01
Elkton Con.	88
El Paso	07
Emma Almee	03
Fanny R.	21
Favorite	02
Findley	05
Flower of the West	005
Golden Crater	003
Golden Fleece	22
Gold & Globe	01
Gold King	55
Gould	03
Gravel Hill	01
Hayden	004
Ingham Con.	04
Isabella	23
Jack Pot	07
Kimberly	02
Magnet Rock	01
Matosa	28
Mountain Beauty	01
Mollie Gibson	19
Moon Anchor	97
Mount Rosa	12
New Haven	02
Orion	003
Orphan Bell	06
Peoples	01
Pharmacist	03
Pilgrim C.	1.18
Pr Albert	02
Rattler	01
Specimen	03
Theresa	06
Trachyte	02
Union Gold	18
Work	05

SALT LAKE CITY	
Alice	27
Alta	30
Alliance	38
Anchor	80
Buckeye	06
Bullion Beck	5.25
Cent. Eureka	38
Chloride Point	1.38
Daisy	84
Dalton	01
Dalton & Lark	07
Daly	45
Daly West	45
Dexter	3.15
Eagle	08
Eagle & Blue Bell	1.87
Four Aces	48
Gelena	80
Geyser-Marion	01
Gravel Hill	09
Grand Central	8.00
Homestake	05
Horn Silver	1.15
Joe Bowers	15
Little Pittsburg	15
Lower Mammoth	73
Mammoth	2.00
Mercur	7.65
Northern Light	49
Omaha	53
Ontario	8.20
Overland	2.00
Richmond Ana.	01
conda	05
Sacramento	53
Silver King	30.00
Star Consolidated	1.75
Sunbeam	12
Sunshine	42
Swansea	3.67
Swansea	1.28
Tetro	13
Utah	95
Valde	1.40
West M't'n Pl'cer	87
Young America	50

NEW YORK	
Adams Con.	08
Alamo	05
Alice	08
American Gold	085
Anaconda Gold	60
Belcher	20
Best & Belcher	42
Breece	95
Brunswick	13
Caledonia	50
Cannon Ball	0035
Chollar	24
Chrysolite	13
Comstock Tunnel	04
Comstock Stocks	04
Comstock Script	04
Consolidated Imp	03
Con. Cal. & Va.	1.40
Copper Rock	00
Cr. & Cr. Creek	05
Crescent	15
Crown Point	15
Cripple Creek Con.	10
Deadwood	40
Elkton Cons.	95
Enterprise	35
Fathered Smet	14
Garfield Cons.	01
Gold Magnet	00
Golden Fleece	25
Gould & Curry	22
Hale & Norcross	1.70
Homestake	5.00
Horn Silver	1.15
Isabella	23
Iron Silver	15
Japan	6.00
Jefferson	08
Julia Consolid.	01
Jurian	01
King & Pemb.	13
Lacrosse	14
Lagonda	40
Leadville Cons.	09
Little Chief	17
Mexican	40
Mollie Gibson	20
Mt. Rosa	20
Occidental	61
Old Gold	00
Ontario	6.25
Ophir	03
Pharmacist	03
Pilgrim	00
Plymouth	10
Portland	1.50
Potosi	1.75
Quicksilver	6.00
Quicksilver pfd.	6.00
Rocky Mountain	03
Savage	18
Sentinel	00
Sierra Nevada	1.15
Small Nevada	1.25
Standard	1.80
Union Con.	20
Union	18
Utah Con.	12
Waldorf	02
Work	13
Yellow Jacket	22

DENVER STOCK REPORT	
Aetna	001
Anchor Leland	67
Anaconda	37
Arcadia	01
Argentum Junata	20
Banner	—
Bob Lee	—
Elkton	—
El Paso G.	—
Enterprise	—
Fanny R.	—
Garfield Grouse	—
Geo. Washington	—
Golden Eagle	—
Gold Coin	—
Gilpin & C. C.	—
Gilpin Four	—
Golden Fleece	—
Isabella	—
Keystone	04
Lillie	99
Matosa	22
Mollie Gibson	20
Moon Anchor	97
Mt. Rosa	12
Old Gold	—
Peoples	—
Pilgrim C.	—
Pine Creek	—
Portland	1.18
Prince Albert	01
Republic	02
Sacramento	02
Smuggler	—
Specimen	—
Tamarrack	007
Union Gold	13
Virginia M.	03

Iron Clad	02
Jack Pot	03
Wheat of Fortune	002
Work	9/20

MEXICO

Name of Company	State	Price
Allianza	Hidalgo	5
Amistad y Concordia	"	24
Angustias	Guajuato	390
Arevalo y Anexas	Hidalgo	240
Asturiana y Anexas	Zacatecas	170
Barradon y Cabras	Durango	150
Bartolome de Medina	Hidalgo	100
Cabezon y An.	Zacatecas	30
Candelaria de Pinos	"	150
Capusaya	Durango	120
Carmen	Hidalgo	400
Castellana y San Ram	Tepec	25
Cerro Colorado	Chihuahua	10
Cinco Senores y An.	Guajuato	440
Concepcion y Anexas	S. Luis Potosi	100
El Oro	Guajuato	49
Reparanza y An.	Mexico	1,300
Guadalupe	Guajuato	180
Huautla	Santa Ana	100
Luz de Borda	Michoacan	40
Luz de Maravillas	Hidalgo	100
Pabellon	"	150
Palma	Zacatecas	75
Purissima de los Com	"	5
Real del Monte	Hidalgo	900
Refugio y Va	"	8
Restauradora	Durango	60
San Francisco	Hidalgo	270
S. Ped. Chalchihuites	"	12
San Rafael y Anexas	"	925
do, Frae Stock	Hidalgo	400
San Rafael del Oro	"	20
S. Maria de la Paz	S. Luis Potosi	850
Sirena	Durango	50
Soledad	Hidalgo	500
Sorpesa	"	250
Trinidad	Guajuato	40
Tlaxiungo	Puebla	27
Union	Hidalgo	260
Zonahuacan (gold)	Vera Cruz	100
Zona Min. de Pozos	Guajuato	15

NOTE—The above Mexican stocks are figured on the basis of Mexican silver

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Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating any ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

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Pamphlet No. 100

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THE PORTLAND GOLD MINING CO.,

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Mines at Victor, Colorado.

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Gentlemen:—We bought two years ago one of the largest

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Inlet Compressor.

This was found to be too small for our needs about a year

ago and we purchased of you a Duplex Corliss machine

16" x 18 1/4" x 42".

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since, and at times over ten 1/2"

Ellipse drills. The steam cylinders were connected to an in-

dependent Jet Condenser, for which we are using the mine

water, and the resultant economy of operation is very

noticeable.

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation.

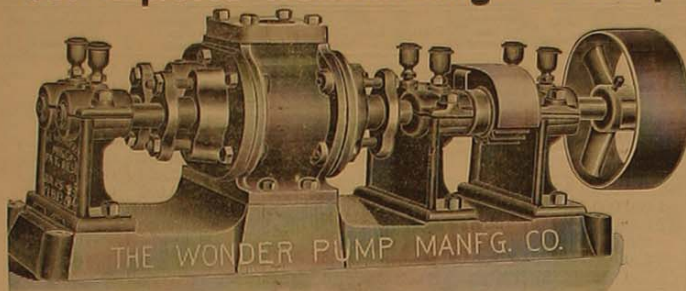
Our mine is equipped exclusively with your drills and we

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Yours very truly, The Portland Gold Mining Co.,

Jas. A. Burns, President.

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We also Build Vertical Style for Mining Purposes.
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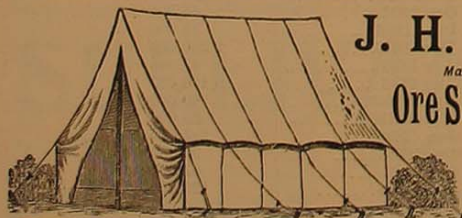
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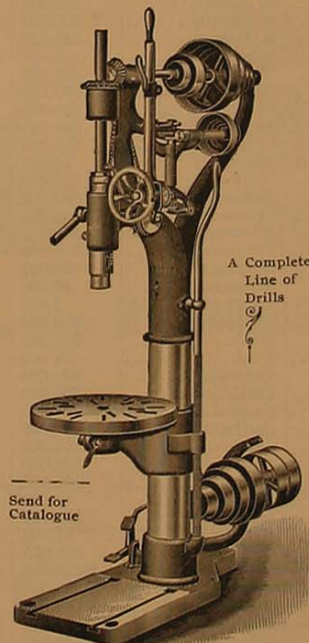
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Gold & Silver... .75 Gold, Silver, & Copper... 1.50
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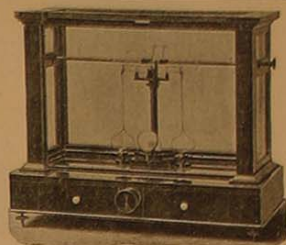
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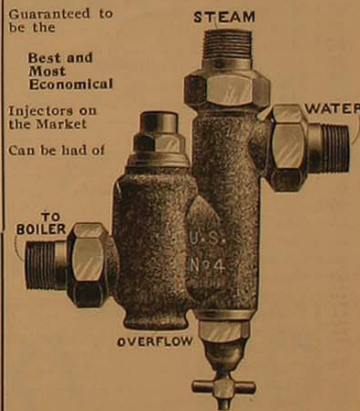
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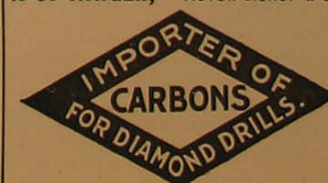
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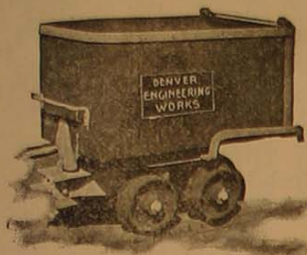
NEW YORK

INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	\$ 500,000	\$ 5	\$ 10	Oct 1898	\$ 150,000	Q.
2	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	July 1898	3,550,000	G.
3	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1898	299,031	G.
4	Alice	Montana	400,000	10,000,000	25	05	April 1898	1,075,000	G, S, L.
5	Anaconda	Montana	1,200,000	30,000,000	25	1 25	Nov 1898	8,250,000	C.
6	Anchoria Leland	Colorado	600,000	600,000	1	01	Nov 1898	168,000	G.
7	American Gold	Colorado	300,000	3,000,000	10	09	Oct 1898	382,000	G, S, L.
8	Associated	Colorado	1,250,000	1,250,000	1	01	Nov 1898	50,000	G.
9	Atlantic	Michigan	40,000	1,000,000	25	1 00	Feb. 1898	780,000	S.
10	Aurora	Michigan	100,000	2,500,000	25	50	May 1898	750,000	L.
11	Bald Butte	Montana	250,000	250,000	1	03	Oct 1898	627,148	G, C, S.
12	Big Six	Colorado	500,000	500,000	1	00½	May 1898	15,000	G, S.
13	Boston & Montana	Montana	150,000	3,750,000	25	5 00	Nov 1898	9,125,000	G, C, S.
14	Breece	Colorado	200,000	5,000,000	25	05	Dec 1898	30,000	L.
15	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Dec 1898	2,535,000	G, S.
16	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	Nov 1898	579,000	S, L.
17	Cariboo	British Col.	800,000	800,000	1	02	Aug 1898	236,965	G.
18	Calumet & Hecla	Michigan	10,000	2,500,000	25	10 00	Sept 1898	54,850,000	C.
19	Centennial Eureka	Utah	30,000	1,500,000	50	50	Dec 1898	2,250,000	S, L.
20	Central Lead	Missouri	10,000	1,000,000	100	50	Nov 1898	77,000	L.
21	Champion	California	34,000	340,000	10	25	April 1898	296,200	G.
22	Charleston	S. Carolina	10,000	1,000,000	100	1 50	Sept 1898	165,000	G.
23	Chloride Point	Utah	500,000	500,000	1	01	Dec. 1897	5,000	G, S.
24	Colorado Smelting	Montana	100,000	1,000,000	10	50	July 1898	1,595,000	G, S, C.
25	Crowned King	Arizona	600,000	6,000,000	10	02	Oct 1898	208,000	G, S, L.
26	Deadwood Terra	S. Dakota	200,000	5,000,000	25	05	May 1898	1,350,000	G.
27	De Lamar	Idaho	400,000	2,000,000	5	29	May 1898	2,451,800	S, L.
28	Dutch	California	150,000	1,500,000	10	04½	Feb 1898	39,000	G.
29	Elkton Consolidated	Colorado	1,250,000	1,250,000	1	01½	Oct 1898	636,961	G, S.
30	El Paso	Colorado	650,000	650,000	1	01	Jan 1898	12,093	G, S.
31	Empire State	Idaho	75,000	750,000	10	10	Nov 1898	35,000	G.
32	Enterprise	Colorado	500,000	500,000	1	05	Sept 1898	900,000	S, L.
33	Fern	British Col.	200,000	200,000	1	05	Jan 1898	110,000	G.
34	Geyser-Marion	Utah	300,000	1,500,000	5	02	Sept 1898	95,000	G.
35	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Oct 1898	120,000	G.
36	Golden Cycle	Colorado	200,000	1,000,000	5	02½	Oct 1898	155,000	G.
37	Gold Coin	Colorado	200,000	1,000,000	5	05	Nov 1897	160,000	G, S.
38	Golden Reward	S. Dakota	1,000,000	1,000,000	15	15	Feb 1898	155,000	G.
39	Grand Central	Utah	250,000	250,000	1	12½	Dec 1898	218,750	G, S, C, L.
40	Halls Mines Ltd.	British Col.	250,000	1,250,000	5	25	May 1898	160,000	G.
41	Highland	S. Dakota	100,000	10,000,000	100	20	Nov 1898	3,764,718	G.
42	Holy Terror	S. Dakota	300,000	300,000	1	03	Sept 1898	117,000	G.
43	Homestake	S. Dakota	125,000	12,500,000	100	50	Nov 1898	7,118,750	G.
44	Hope	Montana	100,000	1,000,000	10	10	Mar 1898	762,252	S.
45	Horn Silver	Utah	400,000	10,000,000	25	05	Sept 1898	5,210,000	S, L.
46	Idaho	British Col.	500,000	500,000	1	05	May 1898	264,000	G.
47	Iowa	Colorado	1,000,000	1,000,000	1	00½	June 1898	90,000	G.
48	Iron Mountain	Montana	500,000	5,000,000	10	02	Apr 1898	507,500	S.
49	Isabella	Colorado	2,250,000	2,250,000	1	00½	June 1897	270,000	G.
50	Kearsarge	Michigan	40,000	1,000,000	25	10	Aug 1897	160,000	C.
51	Kennedy	California	100,000	10,000,000	100	48	Aug 1898	1,796,000	S, L.
52	Le Roi	British Col.	500,000	2,500,000	5	10	Apr 1898	775,000	G.
53	Lillie	Colorado	1,000,000	1,000,000	1	01	Oct 1898	146,110	G.
54	Minnesota	Minnesota	165,000	16,500,000	100	1 50	Oct 1898	4,735,000	L.
55	Modoc	Colorado	500,000	500,000	1	01	Dec 1898	110,000	G.
56	Montana Ltd	Montana	660,000	3,300,000	5	05½	May 1898	2,997,557	G, S.
57	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Oct 1898	800,000	G.
58	Morning Star	California	2,400	240,000	100	5 00	June 1898	666,600	G.
59	Mt. Rosa	Colorado	1,000,000	1,000,000	1	02	Jan 1898	60,000	G.
60	Mercur	Utah	200,000	5,000,000	25	12½	Nov 1898	1,218,000	G.
61	Mammoth	Utah	400,000	10,000,000	25	05	Oct 1898	1,330,000	G, S, C, L.
62	Moon Anchor Gold	Colorado	600,000	600,000	1	07½	Nov 1898	261,000	G.
63	Mountain Copper	California	250,000	6,250,000	25	62½	Sept 1898	93,750	C.
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Oct. 1898	945,000	S, G.
65	Napa	California	100,000	700,000	7	20	Oct 1898	950,000	Q.
66	New Idria Quicksilver	California	100,000	500,000	5	20	Sept 1898	80,000	Q.
67	North Star	California	200,000	2,000,000	10	25	Nov 1898	500,000	G.
68	Ontario	Utah	150,000	15,000,000	100	75	Dec. 1897	13,542,500	S, L.
69	Osceola	Michigan	50,000	1,250,000	25	2 00	Dec 1898	2,552,500	C.
70	Parrot	Montana	230,000	2,300,000	10	30	Oct 1898	2,069,898	C.
71	Pennsylvania Consolidated	California	51,500	5,150,000	10	05	Oct. 1898	46,500	G.
72	Pioneer	California	100,000	1,000,000	10	12½	Dec 1898	50,000	G.
73	Portland	Colorado	3,000,000	3,000,000	1	02	Nov 1898	2,250,080	G, S.
74	Princess	Colorado	1,000,000	1,000,000	1	00½	Feb 1897	47,000	G.
75	Quincy	Idaho	100,000	2,500,000	25	3 50	Aug 1898	10,120,000	C.
76	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	02	April 1897	40,000	G.
77	Raven	Colorado	1,500,000	1,500,000	1	01	March 1898	20,000	G.
78	Reco	British Col.	1,000,000	1,000,000	1	10	Jan 1898	287,500	S, L.
79	Republic	Washington	1,000,000	1,000,000	1	03	Dec 1898	90,000	G.
80	Sacramento	Utah	1,000,000	5,000,000	5	00½	Nov 1898	67,000	G.
81	Santa Rosalia	California	100,000	100,000	1	10	Feb. 1898	125,000	G, S.
82	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	June 1898	3,300,000	S.
83	South Swansea	Utah	150,000	150,000	1	05	Oct 1898	125,000	S, L.
84	Standard	California	200,000	20,000,000	100	10	Aug 1898	5,674,940	G, S.
85	St. Joseph	Missouri	30,000	3,000,000	10	1 50	Sept 1898	2,747,000	L.
86	St. Joseph King	Utah	150,000	8,000,000	20	25	Dec 1898	1,800,000	S, L, G.
87	Slocan Star	British Col.	2,000,000	1,000,000	0.50	05	Mar 1897	350,000	G.
88	Smuggler	Colorado	1,000,000	1,000,000	1	01	Oct 1898	1,075,000	S, L, Z.
89	Swansea	Utah	100,000	500,000	5	05	Dec 1898	136,500	S, L.
90	Tamarack	Michigan	60,000	1,500,000	15	3 00	June 1898	5,331,000	C.
91	Victor	Colorado	200,000	1,000,000	5	50	Dec 1898	1,155,000	G.
92	Vindicator	Colorado	1,500,000	1,500,000	1	05	Oct 1898	180,500	G.
93	Western Mine Enterprise	Montana	500,000	500,000	1	20	Jan 1898	48,680	G.
94	War Eagle	British Col.	2,000,000	1,000,000	1	01½	Oct 1898	239,000	G.
95	Wolverine	Michigan	60,000	2,500,000	25	1 00	Oct 1898	60,000	C.
96	White Water	British Col.	125,000	1,250,000	5	32	April 1898	194,000	G.
97	Yellow Aster	California	100,000	1,000,000	10	10	Oct 1898	148,789	G.

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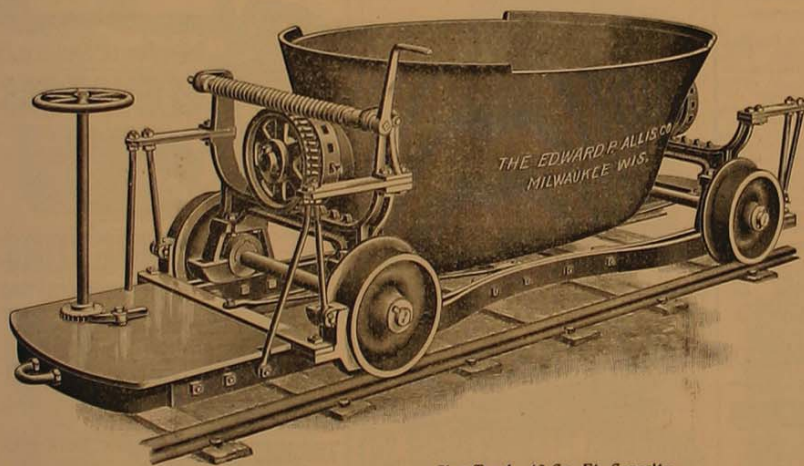
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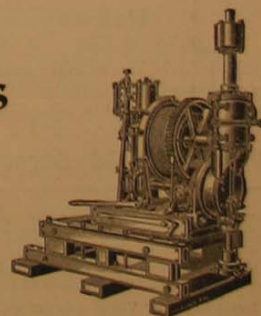
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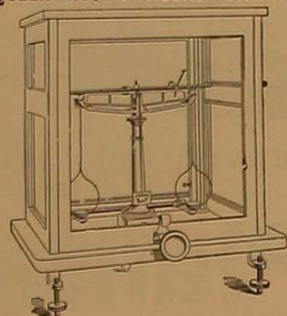
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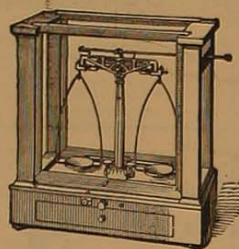
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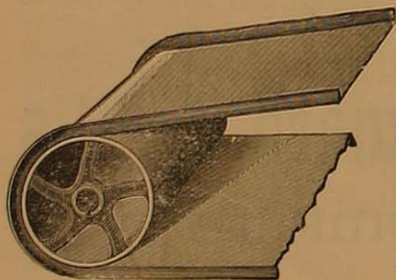


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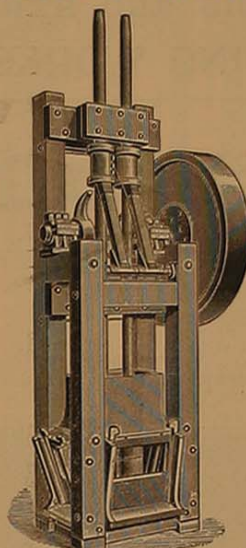
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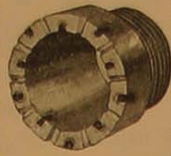
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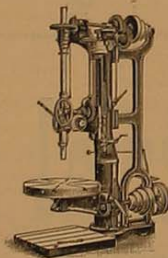
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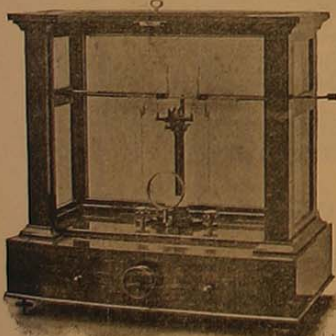
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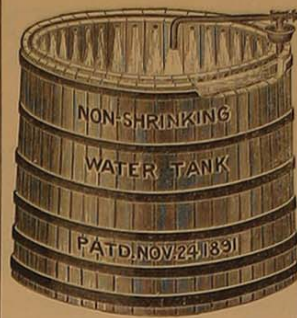
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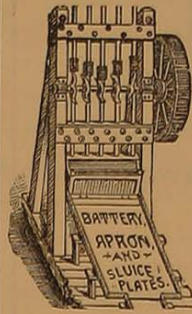
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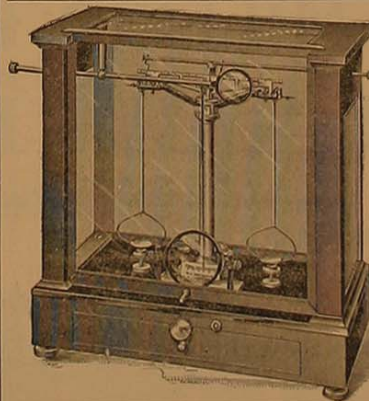
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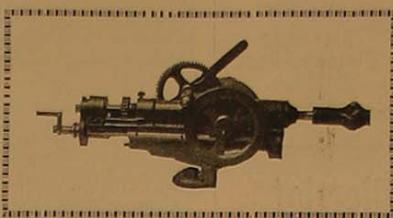
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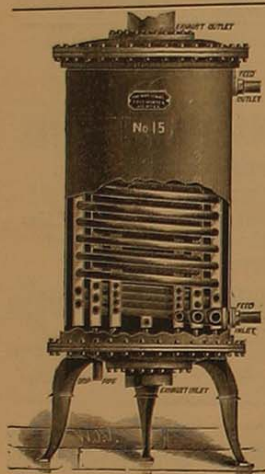
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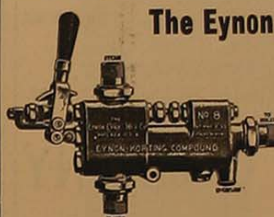
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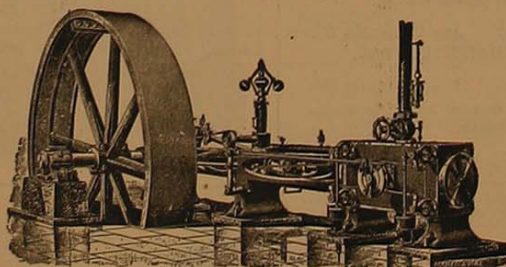
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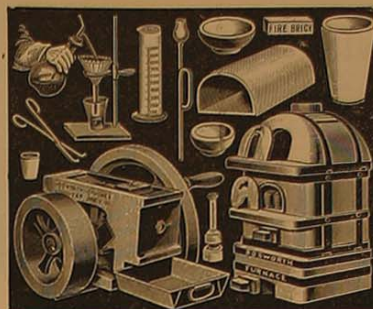
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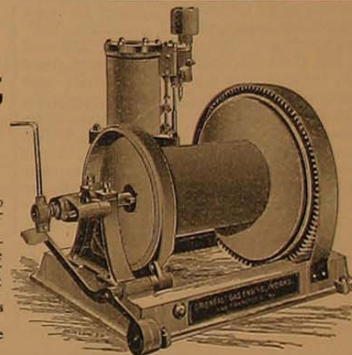
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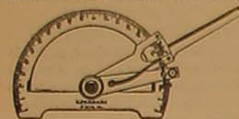
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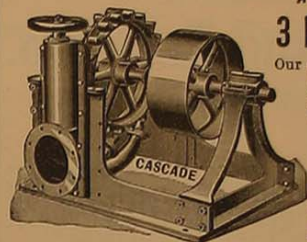
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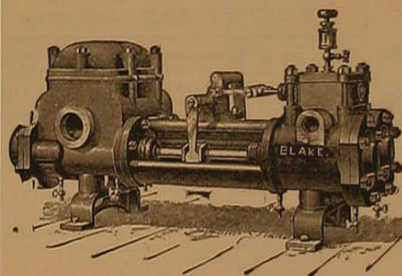
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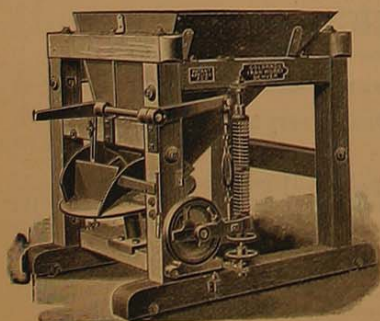
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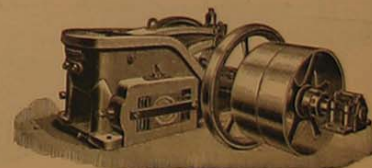
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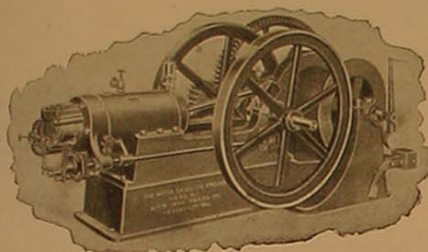


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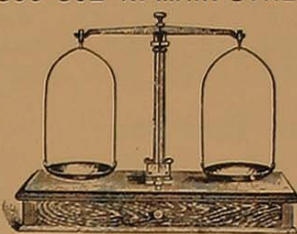
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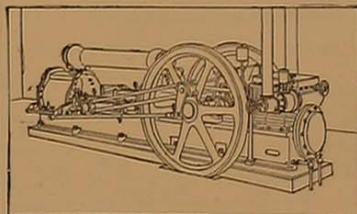


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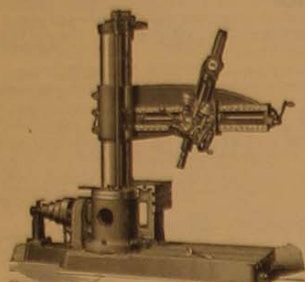
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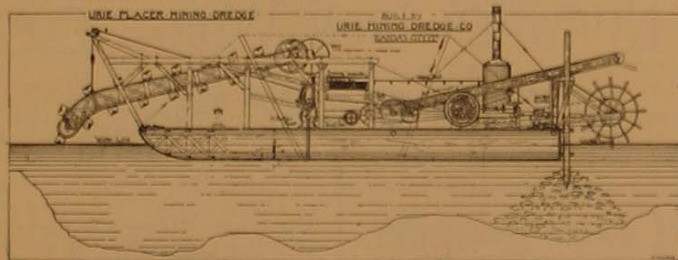
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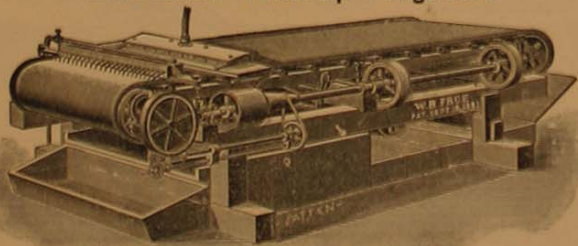
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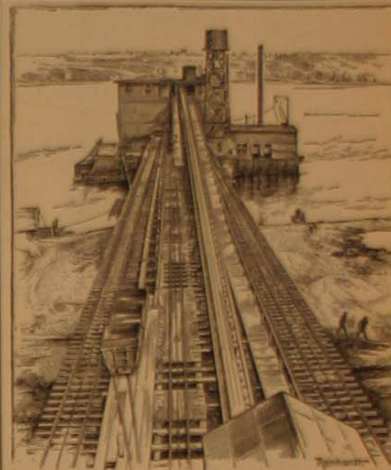
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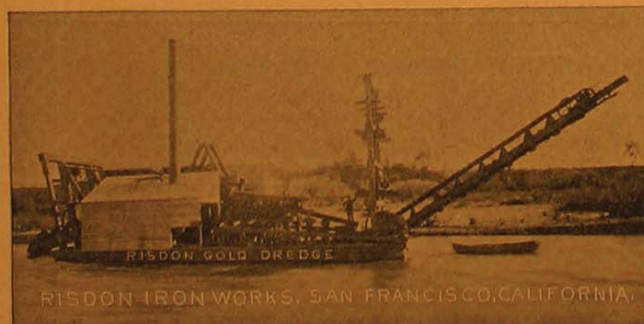
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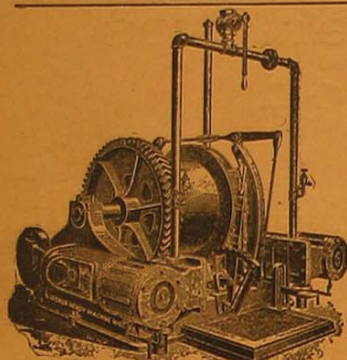
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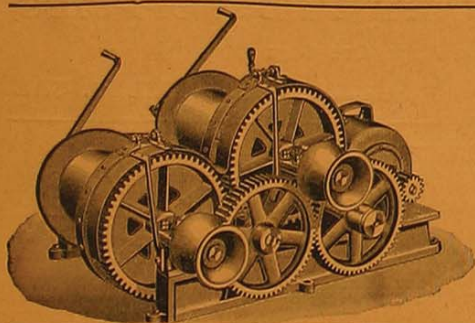
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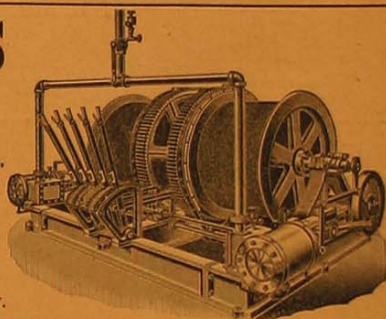
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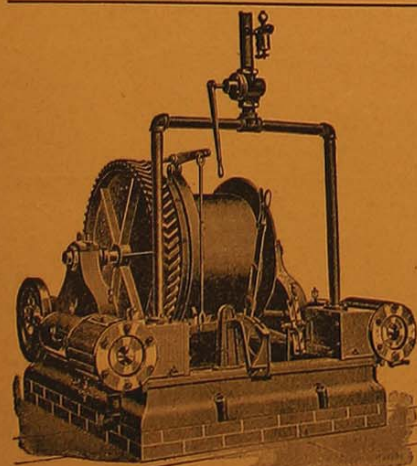
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